RAILROAD GAZETTE

FRIDAY, JUNE 1.

The Late William Mason.

William Mason, the distinguished locomotive builder, died on the afternoon of May 21 at his home in Taunton, Mass., of pneumonia, at the age of 76. He was born in Mystic, Conn., and with nothing but his hands and genius made for himself a name and a fortune. No one in this country has done so much to develop and perfect the American locomotive as Mr. Mason. He was a wonderfully ingenious man, and combined with his ingenuity a high order of the artistic sense, so that his work was always most exquisitely designed. Just as architecture has been spoken of as "frozen music," so it might be said of Mr. Mason's locomotives that they are melodies cast and wrought in metal.

Of the work that he did during his lifetime, no full account has ever been given. We are fortunate in having a verbatim report of a conversation had with him some months before his death, in which he related much of his experience and recounted what he had done during his professional and business career. Probably no better idea can be given of his life and of his work than to quote freely from this report.

WILLIAM MASON.

In the conversation referred to he said:

"I learned my trade in Canterbury, Conn., but I came from Killingly. I went up into New York State one season and often was at Utica. Old Captain Baker was making cotton sheeting, etc., and he heard they were making cotton diapers in the vicinity where I was, and he wrote up to see if I couldn't learn how to make cotton diapers and put the machinery into his mill. I found there were none woven on looms, but they were done by hand. I studied the matter a little and made some looms for him to make such goods. I built them at Canterbury, where I was learning my trade. The machine shop was under the cotton factory—they were all under the cotton factories in the old days. After I got through with this job I was fooling about for some time, painting portraits, making fiddles and one thing and another. Finally they sent for me to come up to Killingly. They were trying there to make the ring frame. Somebody had got up a ring frame, but it was a miserably poor thing. It would not go at all. I looked it over while I was there and watched it. Two or three men tried it. The man who invented it could not make it go, but they tried it there till they created such a prejudice against it that nobody would have it in the neighborhood. I made up my mind that there was something in it if it was only brought out right, and I took the shop and went into it, and I brought out the frame. I have since been called the father of it. I had hard work to introduce it, about as hard work as I had to introduce the double-truck locomotive. I was twenty-five years old then. There was great prejudice against the ring frame. The only way that I could introduce it was to go to a man who wanted some spinning done and say to him, 'I will make you a frame to do so much more spinning. I will put it into your mill and start it up and you can run it. If you do not like it, I will take it away and it shall not cost you anything.' I never had to take one back. I manufactured quite a number of them in the old shop, until it became known what it was. I then went down to Taunton and brought my machines down. I went there to run a shop of Crocker & Richmond. I was there a year when they failed, and I never got a cent of salary from them. They put the shop into the hands of Leach & Keith to run. I took charge of that, and got up the self-acting mule there. Very soon they failed, and then I bought them out, or rather some one else bought them out for me. I remained there three years and then built the place I am at now.

The cotton machinery I have made has gone all over the United States. I went down to Petersburg, Va., when I was working for Leach & Keith, and designed a mill, and staked it out, and took a contract for the machinery for that firm. I went into business in Taunton in 1842, and commenced building locomotives in 1852. The first that I built went out to Indiana. I afterwards built a number of engines with Boardman boilers. The first were for the Providence & Worcester Railroad, and I built some others for the Illinois Central. I built them for other parties. They were not a success, but that was not my fault. I went according to orders. The most popular locomotives at that time in this country were those built by Rogers. They were the best there were. The first idea I had about improving the engine was to put the cylinders down level. As it was built at that time the locomotive looked like a grasshopper. The old Baldwin engines were worse in this respect than the Rogers. The cylinders were all put up so as to be above the truck. Another thing on the old-fashioned engines was that if anything was the matter with the frame, at either end, you had to take the whole engine down. I was the first to make the front end of the frame separate from the back end, so that the one part could be removed without removing the other part. I have improved it somewhat since. I made the driving-wheels with hollow spokes and hollow rim. I also got up a set of truck wheels about that time. The plate wheels which were put under an ordinary engine truck looked like cheeses. I wanted my truck wheels to have some relation in appearance to the drivers. Therefore, I never have had a plate wheel under any engine that I have built. Sometimes they were put under after the first wheels were worn out. I also put the counterbalance into the rim of the wheel by pouring lead into it, and now have that to perfection. I have a rim that will hold enough lead to counter-balance the revolving and reciprocating parts. The lead is poured into the hollow rim.

"Rogers used the link motion in this country before I did; but he hung it from below. I hung my link above the centre, and had the suspension link the same length as the rocker arm, so that the link block would not slip at all. At that time I was trying to prevent the slipping of the block, but have found since that the slip is of very little consequence, because if it slides at all, it is just as well to slide six inches as two inches, so far as the wear is concerned. A little motion of that kind sometimes wears more than a long motion.

"In staying the crown-sheets I found that the bolts that go up through the crown-bars were riveted, and I found that they were so long they would leak. I thought the matter over and got up the plan which I am now using. Everybody adopted it. They are now put on with a cone at the bottom.

"I designed the arrangement of wedges in the jaws for locomotive driving boxes. I put a shoe next to the box and a wedge behind the shoe and between it and the frame, so that the wedge was out of sight. Rogers adopted that plan. After a while I found that it was not a good way to have a wedge on both sides; that the men on the road were careless and would shove one up too much, so I made one side of the frame straight, and put the shoe on it also straight, and put a wedge on one side only. I now make both jaws straight. Then I put the wedge behind the shoe. Both the wedge and the shoe are tapered. The two together make a straight surface for the box.

"In the full-sized engines I have built I have generally given seven-eighths lap, but on freight engines, which work slow, I make it three-quarters. I give a little lead at full stroke with the link. You do not want too much, for in time you get more than you need. Lap and lead in effect are all the same thing. The only thing that made locomotives run quick was the lap. The original slide-valve had no lap, and, of course, they could not get rid of the steam, because it would not exhaust. The lap was what gave the lead to the exhaust. The lead has precisely the same effect on the exhaust as the original lap would have. That is the whole secret of the lead. They used to think that they must have a lead or else the engine would not run smart. It was not because it let the steam in quicker, but because it let it out quicker.

"Compression is a valuable thing in a locomotive. The steam you catch in the cylinder there is not lost. It enters as a cushion to stop your piston, whereas if you did not have that your engine would go to pieces very quick. It is all nonsense to say that the steam which fills the clearance spaces and the steam ports is lost. About the time that I commenced to build locomotives they were all trying to get rid of the compression. You see it answers as a cushion, and leaves the passages all full at high pressure, so that you do not need any lead. Sometimes you get more pressure there than you have in the steam chest, and on that account you do not need any lead. In slow running engines you do not need so much lap and lead, because you have more time to exhaust and you hold your steam longer. For that reason, of late years, when I come to reflect, I have given little if any lead on the link motion, because in starting a train they want to hold on to the steam as long as they can. As soon as they begin to go quicker, they begin to cut off, and then they begin to have lead.

"I built quite a number of engines with perforated supply pipes and without a dome, excepting a small one for the whistle and safety valve. The plan worked very well.

"I am now making the top of the outside shell of the fire-box of boilers for double-truck engines flat, and staying the crown sheets direct to the flattened portion with straight stay-bolts. It is better than the common way of staying the crown sheet

"I am also overhauling the designs of my ordinary American locomotive. I began some time ago and made new patterns for wheels, etc., and am making the engine generally heavier and stronger, larger bearings, etc. I am going to make the bearings for the driving-wheels 8 in. in diameter. I have been thinking of getting up a slab frame for the 18-in. cylinder engines. I have thought of making it a slab frame alongside the fire-box. I could then get 5 in. more width in the fire-box, but would have to put the springs below the frames.

"I do not believe that there will be as great an increase in the size of locomotives during the next ten years as there has been during the past ten years. I think they are

making a mistake in building those large engines and in making such big wheels. I saw some on the Pennsylvania road, which I think have 6½ or 7 ft. driving-wheels.

"I commenced building double-truck locomotives twelve years ago. I have an application now to build some engines like those that I made ten years ago. The first one which I made was the "Janus,"* which had a double boiler and two sets of cylinders. It was the first one I built, and probably I will never make another like it. You cannot make a practical engine on that plan. It is not possible to carry a sufficient supply of fuel and water. Such an engine should carry at least 4,000 gallons of water, and besides, you would have the whole weight of the two boilers, the machinery and the fuel and the cab and the men all on twelve wheels. When the supply of water is exhausted, the weight on the wheels is of course very much diminished. Such an engine, if it carried a sufficient amount of water, would weigh ninety tons.

"The next double-truck engine that I built was a little 10×15 engine, the "Onward."† She was a narrow-gauge engine. When I got through with that, I made up my mind I would never touch another, but after thinking it over I concluded there was something in that principle that could be worked out. The first steam-pipes which I used on these engines worked well, and I am told are still working well, but I have made several changes since that time. A great feature of these engines is that you can make the axle bearings for them just as large as you want, and the fire-box just as wide and boiler just as big as you want them. You are not obliged to get out of the way of anything. I have a fire-box now with 36 square feet of grate surface. You can make it any length you choose.

"The engines are also easy on the track. They seem to humor themselves to the track all through. If it has a depression here and an elevation somewhere else, they split the difference. They get all the weight of the boiler on the driving-wheels, although I now put a leading truck in front which takes a little of the weight off the driving-wheels. I use the Walschaert valve gear on engines with six driving-wheels, of which the axles are close together, and it is then difficult to get an ordinary link motion in. You are obliged to put in two or three levers and go over the axles with the eccentric rods. I made four such engines for the Calumet & Hecla mines. Afterwards I put on the Walschaert valve gear and told them I wished they would take that kind, and they did and have ordered several since. I now put a pair of leading wheels in front of the driving-wheel truck. It protects the tires on roads where there are many curves.

"In a truck of that kind there is a good deal of overhanging weight. We balance that a little where there is no forward truck. We put a rocker in behind to hold down, which is connected with a spring so as to ease it. We put it into the "Janus," for instance. Fairlie had merely a slide. I thought that made too much friction, so I put on the bottom of this a box with stays to it and ends to it for the rocker to play in. It bears down on the frame. The weight of the cylinder pulls down the frame, and the arrangement I have described holds it up. The leading truck carries most of the weight of the cylinder.

"There is no difficulty in carrying as much water as we need in these engines. We can make the tank wider than usual, for the reason that the cab is wider. We make the tank just as wide as the passenger cars. We use a six-wheel truck, and journals 4½ in. in diameter by 8 in. long. We could put an eight-wheel truck under the tank if it was necessary. I have built more engines of that kind for narrow than for wide-gauge roads. Their advantages are greater for narrow-gauge engines than for wide-gauge. I have built about thirty wide-gauge engines for one road. I should like to try a 4-ft. driving wheel and a four-wheel bogy upon passenger trains. I think we could make better time with a heavy train and standard engine with a 5 ft. than with a 5½ ft. wheel.

"My principal business has been cotton machinery. At the time I commenced there was a little slackness in cotton machinery, and for that reason I took hold of locomotives. My locomotive business now is the meanest part of it and always was. I took an interest in it, and tell my friends that I got up locomotives for fun, but that it was the most expensive fun I ever had. I made just enough money from my cotton machinery to pay for my losses on locomotives. I am now doing a good deal of printing-press work, which is done by contract. I have nothing to do with the selling of them, and wish I could build locomotives in the same way. I now employ about a thousand men in my shop; sometimes more, sometimes less.

"A great many men who start in the machine business fail. My own idea of a machine shop is that the money made out of it is always made because the mechanical manager of it is sharper than other people. If he is not he will not make much money. I never knew a machine shop to make money the head of which was not a skillful mechanic. To manage a machine shop a mechanical man with business qualifications is needed. Generally, the successful shops are those that start in a small way under some man who has brains and takes a fancy to machinery and works it up. I can name several of this kind. There were Whiton & Hill, of Providence. There was a shop in Pawtucket managed by Brown. He was a machinist brought up to the vise. So was Hill and so was Corliss. But Corliss' great success was largely due to Bancroft, who was a great mechanic. Bancroft was formerly a partner of William Sellers. Sellers was a very ingenious man. He was a clerk there in Providence at the same time, and he got to conjuring about a sewing machine in his leisure hours and finally got in there as draftsman where Bancroft was. At last that shop was broken up and they went to Philadelphia. Bancroft came from Philadelphia and made some tools in Providence which were the first I ever saw that had any good workmanship in them. I have sold castings to William Sellers of tools that I got up. I could not get a planer worth a cent, and went to work and got some patterns and put some iron into them. Bancroft staid in business with William Sellers until he (Bancroft) died. He built the first planer ever built in this country, I think. They imported an English one and built one exactly like it. I have it now. It goes with a chain. It is not much use, but I keep it going."

A striking illustration of the "resourcefulness" of Mr. Mason was related by Mr. Coleman Sellers, who, on hearing of the death of Mr. Mason, made the following statements:

"In all the early cotton mills, the translation of motion from the engine or water wheel to the line shafting was effected by means of a vertical shaft transmitting its power to the horizontal shafts through a system of beveled wheels. The step under the vertical shaft was always a source of very great trouble. Regardless of all that had been known of friction being dependent on weight and independent of surface, the custom then was to make very small steps under very large shafts and presumably to diminish the amount of friction. No upright shaft in any mill had been known to run cool, and it was a source of continual trouble. Mr. Mason, in thinking of how the difficulty might be overcome, conceived the idea of placing at the foot of the upright a disc of metal, of brass or iron, so large in diameter that the weight of the shaft, and the machinery upon that shaft, pressing upon this disc of metal, should not exert more than 50 to 100 lbs. pressure per square inch of surface, he arguing that if the pressure per square inch was diminished upon the step by an increase of surface, the difficulty would be overcome, provided there was not a too great velocity of the surfaces in contact. Having had constant trouble with one particular upright in a mill in New England, he prepared for that mill such a step. The disc which was at the bottom of the upright was, say 14 in. in diameter. It rested upon a stationary plate, which was made to rock so as to accommodate itself to the overfall of the upper disc. The disc was crossed by two diametrically right-angled grooves, each half an inch wide. Through the centre of the lower block was drilled a hole with lateral holes passing into that to permit oil to flow in and pass up to the centre of the disc. The lower disc was then squared on the outside and supported in a large cast-iron box, which would contain several bucketfuls of oil, burying these discs under the surface of the oil. Above this arrangement was placed a pillow block to hold the shaft in its position of rotation. The machinery looked so cumbersome that the proprietors of the mill refused, Mr. Mason said, to put it in, it was so entirely contrary to their ideas of what should be used in such a case. After the usual period of existence of the old-fashioned steps, the inevitable break-down came. It was then decided to place this new step of Mr. Mason's in and try it temporarily It was put into place and the mill started, when, to their astonishment, they found that the gate of the water-wheel need not be opened so wide as formerly—in other words, that very much less power was being consumed in friction than before. This step of Mr. Mason's, which he himself seemed to have given little thought to, afterwards was brought into the states further south and introduced into all the mills about Philadelphia; and I have seen steps that have been running under those uprights of the Gloucester mills for sixteen years taken out, and the tool marks upon the discs were not even erased, so little had been the friction; the theory of the thing being that the oil is continually drawn up through the centre and spread over the disc by the centrifugal force of the revolution, and that, in point of fact, the two discs never touched each other, but worked upon a naturally formed bearing of oil."

The mechanical ingenuity of Mr. Mason and his skill in designing and constructing machinery were of such a high order, and they approximated so near to the artistic faculty, as to be almost identical with it. In the work he designed he observed the principle which Ruskin laid down with reference to buildings, that "in the main we require of them, as from men, two kinds of goodness: first, the doing their practical duty well; then that they be graceful and pleasing in doing it," and it may be said of him as the same writer said of builders, that what we have to admire is "the knowledge of all difficulties to be met, and of all means of meeting them, and the quick and true fancy or invention of the modes of applying the means to the end." The locomotives designed and built by Mr. Mason indicate at once that he understood thoroughly the practical purpose they had to serve, and the difficulties to be met, and their marvelous grace and beauty showed him to be a master of the means of meeting those difficulties and effecting his purposes. The work which he did always bore the indication of his consummate skill in the adaptation of the simplest and most appropriate means to the ends arrived at.

His shops, the roof of his foundry, the tools and appliances used in the shops, all bore the indication of his skill and genius. Everything that he touched at once assumed a symmetry entirely consistent with the purposes it was intended to serve. The impression produced by his locomotives always was, that they could not have been otherwise—that they were the result of some natural process of growth or development, and the observer was apt to go away from them, as he would from a person dressed in entirely good taste, without any distinct impression how the locomotive was constructed.

Mr. Mason, under what to strangers sometimes appeared an austere manner, possessed a great deal of kind heartedness. The very qualifications which enabled him to succeed as he did, also indicated to him the deficiencies of those who aimed at success and sought his aid. With inefficiency he had little sympathy, but to persons of ability he would offer assistance in a sort of shy, deferential way, as though he considered it a favor for them to accept his help.

He was very fond of the companionship of younger men than himself, who were congenial, and took an interest in a wide range of subjects outside of his own occupation. He was especially interested in art, and was a severe critic with little patience with the careless work now so common among a class of young artists. If instead of devoting himself to engineering and mechanics, he had chosen the career of an artist, his success would doubtless have been very great.

Mr. Mason has left a large fortune. His wife died a few years ago. Two sons and a daughter survive him.

* Illustrated in the *Railroad Gazette* of Feb. 4, 1871.
† Illustrated in the *Railroad Gazette* of Nov. 25, 1871.

Brooks' Narrow-Gauge Locomotive.

The accompanying illustrations are an elevation and half plan of an eight-wheel narrow-gauge locomotive, with 14 by 18 in. cylinders, built by the Brooks Locomotive Works at Dunkirk, N. Y., and now in the Chicago Exposition We expect to publish additional views and a copy of the specifications hereafter.

Contributions.

To Check Negligence in Trainmen.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your terrible and continuous list of train accidents strikes me, and the ten years' schedule of accidents given by the British Board of Trade will be all of my text. It shows a steady decrease in some—I believe in all—of the most important causes, including *negligence*. To be sure, our railroad system and the British are entirely different, both as to character and mileage, but in general there can be no doubt that if some simple plan can be adopted which would tend to increase the feeling of individual responsibility of the men, one very great inducement to accidents would be diminished, and the regularity and capacity of train movement correspondingly increased.

In order to do this I would like to see some such system as the following applied.

On the arrival of *every* train at division headquarters, *each* train hand should report separately and alone to a special officer, who should be an old conductor promoted, who would be familiar with what would be likely to happen on the road under all circumstances. He would have a few regular questions to be answered, and to which each man should sign his name. If any thing irregular happens, the officer would examine in regard to it, also as to the man's physical condition, whether evidently worn out or not. To be sure a tendency to inform and gossip might appear, but I believe it could be regulated, and the record would be of use in many ways. If properly managed, I think it need not detain the men long. The office, to be sure, must be conveniently situated, and the examining officer would have to be a marvel; but would not the system pay? I think it would, and that it might profitably be extended to station hands.

The Uniformity Question.

TO THE EDITOR OF THE RAILROAD GAZETTE:

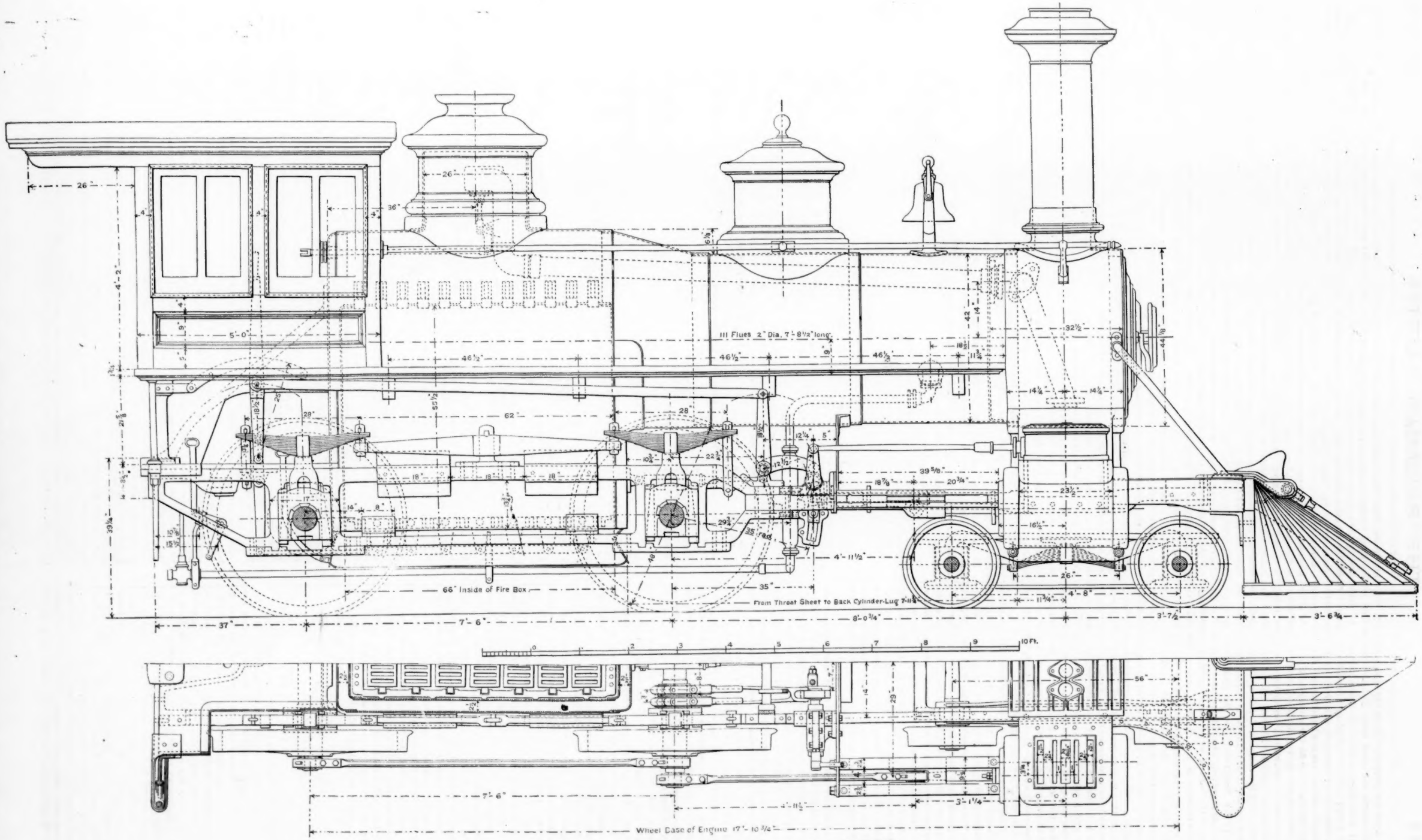
The every day contest with the difficulties of interchange of freight cars, growing out of a lack of uniformity, as well as the thread-bare condition of the question, by discussion, leads to the discovery at least of one important fact, and it is this: Discussion alone can no more produce a standard construction for freight cars than the shadow of the raven's wing could disturb the waters around the ark, but discussion goes on annually as though this delusion was cherished by many.

So long as the world moves by law, and progress yields obedience to well-directed, earnest, systematic effort, it is idle to hope for improvement without a little creative energy, assisted by practical down-right earnest work, if permanent results are to be reached.

It is admitted that the method of constructing freight cars stands about where it did 15 or 16 years ago, terribly magnified by the increased number, and almost in proportion to the increase is the diversity of patterns, multiplied until the last report recorded over 300 varieties of brake-shoes in use, and the number steadily increasing (see circular of the Master Car-Builders' Executive Committee published in the *Railroad Gazette* of May 18, for interesting reading). Consider for a moment the result. Each trunk-line road must provide patterns at an enormous cost, keep a large stock on hand, or suffer annoying delays and extra expense in procuring them from the road owning the car.

The problem of to-day is not what it was fifteen or sixteen years ago, when a stray car excited as much curiosity among car-builders as a circus among the boys in a country village. To-day the wonderful progress in the interchange of traffic has practically annihilated individual ownership so far as the movement of freight by each company in its own cars is concerned. The problem, then, should be met on a broad and comprehensive plan, which shall comprise the question of construction as a whole throughout the entire country.

This is a practical and economic question of the largest proportions. There was a time—and it may not have gone


111 Flues 2" Dia. 7' 8½" long
66" Inside of Fire Box
From Throat Sheet to Back Cylinder-Lug 7'-11"
Wheel Base of Engine 17'-10¾"
0 1 2 3 4 5 6 7 8 9 10 Ft.

NARROW-GAUGE LOCOMOTIVE AT THE CHICAGO EXPOSITION.

Built by the BROOKS LOCOMOTIVE WORKS, *Dunkirk, N. Y.*

by yet—when the several shops on the same road each constructed entirely different cars. Is there any reason or practical advantage in this? If it is good policy for each shop on a railroad to control and make its own plans for construction, then it is equally wise for the various trunk-line railroads (whose cars are interchanged as freely as cars from the different shops on the same road) to do the same thing. Do we realize the irresistible movement in the direction of progress in agricultural pursuits and manufacturing interests, and the immense increase of traffic involved in the problem, and the increase of rolling stock required to meet the demand? (See editorial in the *Railroad Gazette* of May 18, 1883.) Emigration and the increase by birth will indicate to us something of what the future will do for the railroads in the way of an increased traffic and the multiplying of difficulties in this direction, unless the evil tendencies which are the natural outcome of the present promiscuous system of construction are overcome by a wise and practical plan of action.

"Uniformity" in the first place would be a great source of economy; it would obviate delays in transit caused by broken parts, as then each company would always have pieces to immediately replace breakages; it would greatly reduce the stock to be carried by each company and the expense of patterns and keeping spare parts which may now be required, thus losing the cost to the company except a trifling return for the scrap. This is all wrong. Nobody denies this, and therefore nobody need discuss it. It is idle to insist on discussing what no one doubts; equally idle to discuss its economy, for every one admits it.

It is not easy to exaggerate the importance of this question or to measure the influence the master car-builders may have in accomplishing its success. Gentlemen, the responsibility, by virtue of your position, rests with you; and to-day, the managers of railroads, under whose direction you are acting, are looking to you to see what you will do about it. Time has ripened this question, and it demands immediate attention. If a carcass lay at your door you would not assemble your neighbors together to discuss the matter of how to dispose of it, and then adjourn for future action. No, if it were pretty well rotted, the discussion would be short and the action vigorous. Well, this question represents a carcass pretty well rotted. What will you do with it?

Now, as the managers or master car-builders cannot, in mass, arrive at definite plans of action, they should select a committee or commission, conferring upon them such authority as they please; and they acting by representation may secure the aimed at result in a much shorter time than many suppose, and too without incurring additional expense.

Ten years ago if a standard, uniform car had been adopted for all new construction and all renewals, the result, to say the least, would be very gratifying to-day.

Railroad interests in this direction are mutual, and combined effort alone can accomplish success. Without it, failure is evident; with it, success is possible. I understand the prejudices against such an infringement on the rights of individuality, but the people, in their sovereign power, do not exercise that power directly, but intrust it to those whom they select to administer the various departments of government. In line with this well-authorized practice for some time there has been established a Commissioner of Patents, whose services have been immensely valuable to the railroad interests; a Commissioner of Traffic, whose services are invaluable. Now, if combined effort is good in one department of railroad service, why, in the name of consistency, is it not in every department? And I would suggest for the master car-builders' immediate consideration the propriety of selecting a Commissioner of Car Construction and Renewals, for the purpose of harmonizing conflicting opinions and making plans, selecting the best features from the various forms now in use or otherwise, and combining them in one standard construction.

With the present growth of our country in mind, it seems to me that there is scarcely a more important question in railroad enterprise than the one here presented, and not one with such possible economic proportions.

The necessity for instant action on this question is so apparent it would seem that the Master Car-Builders' Association, at its convention in June at Chicago, would appoint or recommend the appointment of some competent person or persons to immediately report plans and means by which this object may be secured with the least possible delay.

NEW ENGLAND.

Train Rules.

IV.

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We now come to that part of our subject which may be called train rules proper, and which is, in some respects, the most important of all; and with the characteristic Yankee propensity to take the shortest cut to the central idea, overriding all subsidiary matters, we would, doubtless, most of us decide that the conductor, being the most prominent figure in the every-day life of a railroad as seen from a short-range standpoint, ought to be the first official to claim our attention. And the conductor is, indeed, really as well as apparently second to none in importance; but, as a train must have a starting-point before it can start, and as a clear track is a prerequiste to the running of a train, we must logically place the station agent before him. There are in this country so many roads that have one terminus at "a bush," and the other one on the tracks of another company, that at first thought a station agent does seem to be a rather useless ornament, except for selling tickets and building fires; but, though he may have few duties that can be called important, their degree of importance is second to none. So many managers make a practice of throwing upon station agents any and every kind of duty for which no other official has been provided, that an appropriate title would often seem to be "man-of-all-work."

Before going into the details of train-running, however, I cannot forbear a word on one more question that is, strictly speaking, outside of our subject, but which bears so closely upon it that it ought to be mentioned. I refer to yard limits. Nearly or quite every code has one or more rules in which it is necessary, or at least advantageous, to define the limits of station yards and to explain what is meant by the "open road;" but all that I have seen leave the matter more or less incomplete. Some leave each engineman to decide for himself where the "yard" leaves off and the "road" begins; others name a certain number of feet or rods from the outermost switch, which is nearly as bad; others limit the yard to the space "within the switches," which in most cases gives too little room and in some much more than is necessary (as regards rules for reducing speed); still others seem to convey a vague impression that the whole road is "yard", and that an engineman must never run so fast but that he can if necessary send a man forward on foot to straighten all "crooked" switches, etc.; and so on. The placing of posts (to indicate the limits at yards) at such distance from the station as it is *found necessary in practice* to use the track for switching, etc is so cheap and simple a remedy, for all this uncertainty, and makes it so much easier to contract intelligible rules that I have assumed, for the purposes of this discussion, that all managers who care for sensible rules have put the plan in practice; and I have written accordingly.

In the following "instructions to station agents" the first four rules may be regarded as class *a*; numbers 20, 21, 22, 33, 38, 39 as class *b*; number 37 as class *c*, and numbers 23 to 32, inclusive, and 34, 35, 36 as class *d*.

TO STATION AGENTS.

16. You must see that each of your subordinates is familiar with such of these rules as concern his duties.

17. You are expected to have care for the general interests of the company at your station (in the absence of any higher officer) and to perform any reasonable service in connection therewith that may be required by any officer of the company.

18. Your duties in the passenger, ticket and baggage departments are to be performed under the direction of the General Passenger Agent.

19. Your duties in the freight department are to be performed under the direction of the General Freight Agent.

20. You must keep constantly at hand in your office, ready for use without delay, three bright red flags, two red lanterns, one white lantern and six torpedoes.

21. Each switch on the main track must be lighted every day at sunset, or as near that time as practicable, though never more than fifteen minutes *later*, and the lights must be extinguished in the morning as soon after daylight as practicable. The lamps must be kept on the switches during the day.

Each lamp must be so placed on the switch that it will show to the approaching engineman a *green* light when the switch is set for the main track, and a *red* light when it is set for any other track.

22. Whenever you have charge of a red flag or light you must be careful not to exhibit it unnecessarily, or to any engineman whom it is not intended to stop, except as mentioned in rule 35.

23. The clock at your station and all watches carried by employés who may have anything to do with trains or switches, must be compared by telegraph daily with the standard time.

24. In any matter involving the safety of a train or obstruction of track, or where an error in time would be liable to be dangerous, the time must be observed from at least two time-pieces; you must never depend upon one watch or clock alone.

25. Ten minutes before each train is due at your station you must personally see that the switches connected with the track on which it is to travel are in proper position, except in cases in which the division superintendent authorizes this duty to be performed by some other person.

26. *Ten minutes* before each first or second-class, and *five minutes* before each third, fourth or fifth-class train is due to arrive, you must see if the track on which the expected train is to travel is clear; if it is not, the proper signal must be exhibited to stop any approaching train, and if the expected train is of the *first* or *second* class, the signal must be sent at least [half a mile] from the obstruction, as trains of these classes are liable to come at full speed.

This rule, however, is not intended to place upon you any responsibility for the protection of *trains in charge of conductors* which may be in your yard. Each conductor protects his own train.

27. When you come on duty in the morning, or at any time when you cannot learn from your own record what trains (if any) are due, you must learn by telegraph or otherwise from a trustworthy source what right you have to the track before you obstruct the passage of trains, bearing in mind that even when the regular trains have all passed it is important to know what signals (if any) they carried for following trains.

28. Whenever you turn a switch off from the main track you must stay by it and know personally that it is set back at the proper time.

29. You must not allow any train to follow any other train within five minutes, unless authorized by the time table to do so.

30. You must not allow any train to follow a *train carrying passengers* within *ten* minutes unless authorized by the time-table to do so.

31. Whenever a train is followed within twenty minutes by another which travels faster, you must see that the engineman of the faster train knows that the slower train is immediately ahead of him.

32. You must not allow any train to precede a train of a higher class unless it shall be able, by running at a proper speed, to reach the next station ten minutes before the said higher class train shall be due at such station.

33. In the preceding rule "next station" means the the next place where the train in question can be set off clear of the higher class train; and "proper speed" shall be understood to mean as follows, viz:

For an engine without train or with one or two cars, not over....miles an hour; for a passenger train not over....miles an hour; for gravel or other working trains with ordinary eight wheel cars, not over....miles an hour; with four-wheel dump cars, not over....miles an hour; for a freight train not over....miles an hour; for any train with an engine running backward, not over....miles an hour; for any train with an engine *pushing*, not over....miles an hour.

34. Whenever you receive an order to run a train in variation of the rules you must, before acting on it, get the assurance of the person giving it that your understanding of it is correct.

35. When an order for a certain train is received by you before the arrival of the train, the proper signal for stopping it must at once be fixed in a position where it can be seen both by the approaching engineman and from your office; and the signal must be watched by a competent person until the train for which it is displayed shall arrive. If, in the meantime, a train shall arrive which it is not intended to hold, the signal must be left in its position, and the engineman informed that he is not to be governed by it.

36. You are to keep a record of the time of arrival and departure of all trains that enter or leave your yard, and if there are two or more main tracks, the record must show which one the train travels on. It must also show the number of the train, the number of the engine, and against each engine number, whether or not any red or green signal is carried in front. Except at stations where all trains stop, the record must show whether the train stops or not. At such times as your station is regularly left with no person in charge, this rule may be suspended.

37. Whenever any obstruction or defect of the track is known to you, you must, to the extent of your power, do whatever may be required to secure the safety of trains, even though it may not be strictly within your province to do so.

38. You must report promptly to the officer in charge of the repairs of buildings any defect in buildings or platforms that is dangerous to life or limb, or likely soon to become so.

39. You must report by wire to the proper car-inspector any disabled car left at your station.

The first direction to agents, although in some respects a reiteration of the general rule requiring responsibility for subordinates, seems to be not out of place here, especially as it can be inserted without distracting attention from any other subject. As an additional caution to agents not to entertain the erroneous idea that switchmen, etc., are not expected to read the rules at all, it would doubtless often be useful. Of course in a system requiring *every* employé to be familiar with *all* the rules it would be superfluous.

The subject touched upon in Rule 17 is looked at, of course, in various ways by different managers. Some want their agents to confine themselves in dealing with the public strictly to the routine duties incident to the freight and passenger business; to be merely a "clerk in charge," as the English term it; others seem to regard each station agent as a sort of district representative of the management, capable of doing almost anything, from buying wood-lots and raising trees for sleepers to "bossing" local political caucuses. I have mentioned this rule because it seems to meet the prevailing sentiment among managers, as shown by their rules, but I doubt whether it is of much value. Agents can frequently be of material service to their employers in matters outside of regular station-work, but those who require a general rule to compel them to render such service would be of doubtful service, either in or out of their regular routine.

Rule 20 has one word not generally inserted in such a rule, but the large number of flags of a *piratical* hue that may be seen on many roads would seem to render it not only very appropriate to use such a word, but also highly desirable to have division superintendents and train-masters *bright* enough to enforce the rule. These remarks apply with still more force to brakemen's and engineer's flags. A black flag is literally an emblem of death, with a vengeance, when its blackness (and consequent obscurity) leads a train to destruction.

The tendency which will be found to exist in a good many switchmen's minds, to indulge in the habit of lighting switch lamps whenever it happens to be most convenient, say one, two or three o'clock in the afternoon, is sufficient reason for a rule on the subject, and where lamps are made with movable glasses the last clause of the rule (21) as written above is often useful.

The rule numbered 22 is more frequently than otherwise addressed simply to trainmen with reference to covering tail-lights when the train is standing on a siding, but if it is worthy of insertion at all it deserves to be made more general in its application.

The necessary periodical examination of switches is a matter in which there is much laxity of discipline, and the writer is fully aware that the evil is not to be remedied by any more words. Doubtless nearly every locomotive runner who ever ran over a misplaced switch by his own carelessness would say that he had kept on his guard and had found that particular switch *in its right position* hundreds or thousands of times; and this monotonous familiarity certainly helped to breed the contempt that finally caused him, *unconsciously*, to decide that it was not worth while to look at that particular switch at that particular time. The same considerations apply to the case of a station agent or subordinates, required continually to do a thing which *seems* unnecessary, and which *almost* always entails no evil consequences if neglected. The rule (25) as above written is more rigid than those found in most codes, but is inserted here as a suggestion of one way in which, perhaps, the present practice may be improved upon. It certainly seems necessary that each switch should be in charge of some one person, and that if the station agent, properly or improperly, delegates the duty to subordinates the superior officer should know it.

Rule 26 is generally put in the form of a positive order to have the track clear; but as any tendency toward carelessness about detaining trains unnecessarily is an evil that is always cured, whenever it shows itself, without reference

to the standing rules, and as the main point seems to be to secure safety in case the track *is* obstructed, the rule as written above seems more to the point.

The *distance* a red flag should be sent is a question not necessary to be discussed here. I have inserted a phrase quite commonly used, but do not pretend to decide as to its correctness. This rule being for the guidance of agents in switching and other station work, the last clause seems both necessary and proper. Too many individuals responsible for the same thing is in many cases as bad as too few. Other considerations suggested by this rule will be alluded to hereafter.

Rule 27 is one which is frequently omitted, and where used is often addressed to trackmen only. If good for them it is good for all, and thinking it not poor enough to discard entirely, I mention it here, and have also refered to it in a modified form under the head of instructions to conductors, enginemen and section-masters.

Rules 29 to 33, inclusive, with Rule 36, cover a subject which is touched upon or hinted at in nearly every code, but which at the same time is nearly always left at loose ends. It seems to be always assumed that conductors and enginemen are to get their information from station agents, and yet the latter are frequently left without regulation in the matter. And where rules *are* made, the clause which I have numbered 30 is generally the only one that is specifically stated. I have added numbers 31, 32 and 33 simply because the previous ones seemed incomplete without them. If agents are to do anything toward maintaining interval of time between trains, they ought to do enough so as to have an intelligent interest in doing it as well as possible. Rules 32 and 33 *appear* complicated, but it will be observed that each agent, knowing the distance and running time to the stations next to him either way, can, in practice, have the proper rules *for use at his station* all arranged beforehand, so that there is no stopping to compute the minutes on every occasion requiring the application of the rule.

The above is all written, of course, with reference to the great majority of roads, which depend on the unaided brains of the employés to secure the desired safety ; but, as greatly simplifying the application of these or any similar rules, and as being the next best thing to the block system, at least on double-track roads, the writer is in favor of the introduction of a little machinery (to speak technically) to reinforce the human element. I refer to the system of bulletins, such as is in use on the New York, New Haven & Hartford road, by which each engineman, whether he stops or not, can, at each station, read from the board (or block, with figures carved upon them) the exact time the last train preceded him and also learn the grade of the train. It will be seen at once that this *regular* posting of the time of every train, tends to eliminate some of the elements of uncertainty. The writer is not advised as to whether or not this system is patented * ; possibly the fact that it is *not* may account for its not being "pushed" and so more generally used !

Rule 34 is usually issued only in the regulations for dispatching by telegraph, but as it embodies an important principle, it rightfully belongs in the general rules, and would be both appropiate and important, even on a road not using a telegraph line.

The same considerations apply to Rule 35.

Rule 37, being merely a reminder of the importance of general rule No. 1, would perhaps do as little good as any of those cited here; but, judging from the double and triple safeguards that we find in all kinds of codes, in the shape of repetition, etc., this rule is at least fashionable.

The supervisor of buildings and the master car-builder (or car inspector) having each but a word to say to station agents, the superintendent's code seems to be an appropriate place in which to say that word. I have therefore inserted rules 38 and 39 as above.

[TO BE CONTINUED.]

Locomotive Chimney for Burning Anthracite Coal.

The engravings represent a form of chimney and the arrangement of exhaust nozzles and petticoat pipe which is used on the Central Railroad of New Jersey. The grating used at the top is made of cast iron and is shown in an enlarged scale in fig. 2. This is covered with wire netting, as shown in fig. 1. The engravings show the construction so clearly that no further description is needed.

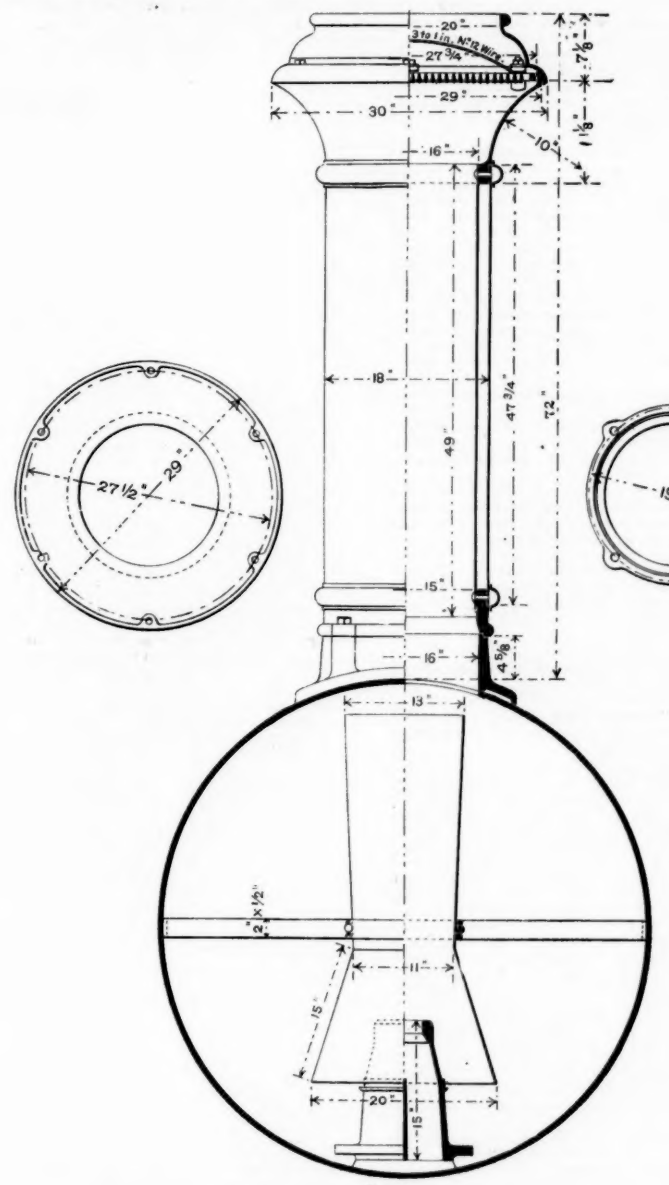

Fig. 1.

LOCOMOTIVE CHIMNEY FOR BURNING ANTHRACITE COAL.

Used on Central Railroad of New Jersey. WM. WOODCOCH, *Master Mechanic.*

The Increased Efficiency of Railways for the Transportation of Freight.

Mr. Wm. P. Shinn last year collected material for a paper on this subject, to be published in the forthcoming report of Joseph Nimmo, Jr., Chief of the Bureau of Statistics, on the Internal Commerce, by whose permission it was presented to the American Society of Civil Engineers at a meeting held Dec. 20 last, and published in the *Transactions* of the Society. Mr. Shinn cites the ton-mileage of three trunk lines, the New York Central, the Erie and the Pennsylvania, to show that there is increased efficiency in carrying freight, giving the aggregate of these three roads in four different years, and the percentage of increase over the ton-mileage of 1860 is as follows:

	1860.	1870.	1880.	1881.
Ton-miles	627,477,805	2,682,603,465	7,485,734,038	8,263,038,412
P. c. of inc. over 1860	.....	328	1,093	1,217

He cites the growth of population and in the production and exports of some leading staples to show what has contributed this growth of traffic, and says:

"The means by which this rapid increase in efficiency has been developed may be considered under two general heads, viz.:

"Improvements in the physical condition of the railroads, such as:

"1. Improved track or 'permanent way,' including bridge superstructure.

"2. Additional sidings, and second, third and fourth tracks.

"3. Increased capacity and strict classification of locomotives.

"4. Increased capacity of freight cars.

"5. Additions to terminal facilities.

"Improvements in the administration, such as:

"6. Improved methods of signaling.

"7. Running locomotives 'first in, first out,' and running freight trains at higher rates of speed.

"8. Consolidation of connecting lines under one management by purchase, lease, amalgamation or otherwise.

"9. Running freight cars through from point of production to tidewater without trans-shipment.

"10. Issuing through bills of lading (or freight contracts) from Western points of shipment to Atlantic and European ports."

The chief element in the improvement of permanent way, Mr. Shinn says, has been the introduction of Bessemer steel rails, which has been accompanied by improved joints, better ballast, alignment and drainage. He estimates that by the introduction of steel the cost of "keeping up track" and "renewals of rails" is reduced from 40 to 60 per cent.

A large increase in second tracks and sidings has taken place in the Middle States especially, but Mr. Shinn shows the enormous traffic capacity of a single track road by citing the experience of the Pittsburgh, Fort Wayne & Chicago, which in 1881, with 468.3 miles of road, 74.3 of second track and 184.8 of sidings and yard tracks, had 10,252,914 train-miles, equal to 30.14 each way daily over the whole length of the road, 5.89 of which were passenger trains.

Improved locomotive capacity is attributed principally to steel rails which have made it possible for heavier engines to run without rapidly destroying the track. In 1863-65 Mr. John B. Jervis, to prevent the rapid destruction of the 60-lb. iron rails then on the Fort Wayne road, introduced locomotives for freight service *lighter* than those previously used, the new ones having 14×22 in. cylinders and 31,000 lbs. on the driving wheels, and hauling 12 to 16 loaded cars, and this change proved an improvement; but on the present steel tracks of the road the standard freight engine has 18×22 in. cylinders and 54,000 lbs. on the drivers, and hauls 22 to 24 loaded cars. On th Pennsylvania Railroad in 1871-72 the standard freight engine exerted a tractive force of 12,500 to 14,000 lbs, as measured by the dynamometer (starting at very slow speed), and drew 18 loaded cars over the Pittsburgh Division; its present standard freight engine pulls by the dynanometer 20,500 lbs. and draws 28 loaded cars over the Pittsburgh Division (The average weight per driving-wheel, however, has increased only from 9,166 to 9,925 lbs., the new engines having eight and the old ones but six driving-wheels.)

Mr. Shinn cites the following average freight train loads (in tons) as illustrating the greater power of recent locomotives:

	1867.	1870.	1875.	1880.	1881.
N. Y. Cen	....	....	166	219	218
Erie	....	....	134	218	218
Penn.:					
Main line east	....	....	....	283	287
" both ways	....	112	128	184	186
P. & E. Div	....	118	164	266	275
P., F. W. & C	102.8	....	....	160.3	171.5

Showing an average increase of about two-thirds since 1870 and 1875.

The effect of the improved truck on locomotive repairs is thus illustrated by the following statement of the cost of repairs per 100 miles run on the Pennsylvania Railroad for five different years, as follows:

1865.	1870.	1879.	1880.	1881.
$16.65	$9.13	$5.30	$7.02	$6.02

[Mr. Shinn neglects to note that the price of gold averaged about 158 in 1865 and 115 in 1870, and the gold cost in those years was thus, $10.54 and $7.94, which better represents the difference from the cost of late years than the $16.65 and $9.13 of the currency cost.]

From this point we copy Mr. Shinn's paper in full:

By *strict classification* of locomotives, much greater efficiency is reached with the same number. The Pennsylvania Railroad Company now has practically but two classes of freight locomotives.

4. *Increased Capacity of Cars.*—For many years, say from 1855 to 1876, the standard capacity of freight cars was 20,000 lbs., although much more was frequently loaded on a car. About 1877 a few cars were built to carry 30,000 lbs., and since 1879 the standard freight cars built for the principal east and west lines of railroad have been constructed to carry 40,000 lbs. I am informed that the Pennsylvania Railroad Company has ordered the construction of some cars having 50,000 lbs. capacity. This increased capacity is obtained by using a somewhat heavier car body, or "cargo box," with slightly heavier axles and journals. The comparative weight of a standard Pennsylvania

* This system has been in use on the New Haven road at least 23 years, so that the patent, if it ever was patented, must have expired.—ED. RAILROAD GAZETTE.

Railroad box car, with its load, in 1870 and 1881, was as follows, viz.:

	Weight of car.	Weight of load.	Total.	Load per cent. of total.
In 1870.....	20,500	20,000	40,500	46.38
" 1882.....	22,000	40,000	62,000	64.52
Increase.....	1,500	20,000	22,500	15.14

The benefit both in efficiency and economy of cost from an increase of 30 per cent. in the proportion borne by the "paying load" to the "total load" is too obvious for comment.

The following statement shows the average tonnage of freight per loaded car on the Pennsylvania Railroad and Pittsburgh, Fort Wayne & Chicago Railway for several years:

	1867.	1877.	1878.	1880.	1881.
Penna. R. R	.....	10.13	10 34	11.55	12.31
P., F. W. & C.....	7.98	.....	.....	9.75	10.05

This average includes many cars only partially loaded with local freight; the Pennsylvania Railroad has a large local traffic, which is shipped in full car-loads, thus increasing their average load, which shows a steady and commendable advance, due to the increased use of cars of greater capacity.

5. *Increase in Terminal Facilities.*—These consist of depots and yards for receiving, loading, discharging and delivering freight, in yards and tracks for storing cars and switching, and in floats and lighters for transfer of cars and freight, grain elevators, stock yards, etc., which have been more than doubled in the aggregate since 1870. The increase is still going on, and the expenditure for additional terminal facilities will long continue to be a prominent item in the "Construction" or "Betterment" account.

Considering next the improvements in administration, we have:

6. *Improved Methods of Signaling.*—The "block system," which has been in use abroad for many years, was first adopted in this country on a large scale on the Pennsylvania Railroad. It consists in a division of the road into sections or "blocks" from one to five miles in length, having signal stations at each end thereof, whereby but one train is allowed upon any block at one time, and a following train is forbidden to enter a block until the preceding train has passed the next signal station and the fact has been reported back. Freight trains are sometimes allowed to follow on the same block, under restrictions as to time, being kept five or more minutes apart.

A complete system of block signals is absolutely necessary to the safe and effective working of a crowded track, and the adoption of the automatic electric signal, by which blocks or sub-blocks may be made every mile or half mile, will render railway travel much safer, and greatly increase the effective capacity of the lines.

The subject of "block signals" and "interlocking switches" has received much more attention in England than in this country, and the writer was told in 1876 of a "junction" in the North of England (what we call a "crossing") which was traversed by 720 trains daily, an average of a train every 2 minutes, day and night. The Metropolitan (underground) Railway of London is a conspicuous example of an enormous traffic conducted with absolute safety under very unfavorable conditions by the use of a complete system of block signals.

7. *Running Locomotives "First in, first out," and Running Freight Trains at Higher Speed.*—During the early history of railroads, it was considered essential to economy that freight trains should be limited to a very low rate of speed, and until recently they have been generally "scheduled" at a speed of 10 to 12 miles per hour, and limited to 15 miles per hour as a maximum speed.

The late J. Edgar Thomson, as President of the Pennsylvania Railroad, in his annual report for 1867, referring to the proposed construction of a low grade line for reaching economy in freight traffic, said: "The speed of the freight trains should not exceed an average of 6 miles per hour." When we reflect that this is but one-half faster than a man can walk, and at this speed nearly twice as many engines and one-half more cars will be needed than would be required if the traffic were moved at an average of 12 miles per hour, its adoption seems absurd; and yet Mr. Thomson was high authority, and with the iron-rail tracks and wooden bridges then in use, high speed was very destructive to the superstructure. But with better "permanent way" and iron bridges, higher speed became possible, and freight trains are now scheduled at from 15 to 20 miles per hour.*

Until quite recently, every locomotive had its regular "engineer," and when he slept the locomotive was idle. This was changed on the New York Central & Hudson River Railroad some eight or ten years since, with but indifferent success, by the adoption of the rule of "first in, first out," both for locomotives and crews, so that the next crew in order takes the next engine in order, and by having many more crews than locomotives, nearly 50 per cent. more service is got from the latter, with less deterioration caused by frequent alternations of heating and cooling.

The Pennsylvania Railroad Company, after carefully experimenting with it on their Middle Division, adopted it for their whole line in 1878, and the benefits of this system were shown by its results in 1879, as will be seen by reference to Schedule E, giving the average miles run per annum by freight locomotives on the Pennsylvania Railroad, and the average number of tons of freight hauled by each from 1870 to 1881.

It shows as the average of all divisions:

Per locomotive:	Miles run.	Average ton-mileage.
In 1870.....	19,244	2,100,000
In 1878.....	20,000	3,000,000
In 1879.....	24,355	4,200,000
In 1881	27,644	5,100,000

—an increase in mileage of 38 per cent., and in effective service of 150 per cent., from 1870 to 1881. Of course, much of this latter increase is due to the use of more powerful engines and better cars, as before stated.

8. *Consolidation of Connecting Lines Under One Management.*—This has changed in a wonderful degree the condition of our "railway system," and greatly to the improvement of its efficiency. Where in 1860 it was rarely that 500 miles of railroad were under one management, now from 1,000 to 3,000 miles in one organization is the rule rather than the exception.

Schedule F shows the length of roads and the gross earnings in 1881 of 11 of the principal systems, from which it will be seen that the 3 "trunk line" systems controlled 10,113 miles of railroad, being 10.7 per cent. of the total mileage for which earnings were reported in Poor's Manual for 1881, and their aggregate gross earnings were $155,371,388, or 21.4 per cent. of the total earnings reported for 1881; while the 11 systems indicated had 35,808 miles of road, or 37 per cent. of the mileage for which earnings were reported for 1881; and their aggregate earnings were $309,522,977, or 42.7 per cent. of the total earnings reported.

The amount of negotiations, disputes, delays and general friction saved by having but 11 parties in control of these lines instead of 100, can scarcely be estimated, and this has been a potent factor in bringing about increased efficiency.

9. *Running Cars Through from Point of Production to Tide-water Without Transhipment.*—This has become quite a general practice with shipments produced east of the Mississippi River, and the products of the states and territories west of the Mississippi are rarely transhipped more than once before reaching tide-water. Grain from Chicago and St. Louis is shipped all-rail, not only to the principal cities of the Atlantic seaboard, but to the points of consumption in the interior of all the Middle and New England States. The delays incident to transhipment are great drawbacks to the effective use of cars, and as well by the saving in cost as by the avoidance of these delays has transportation been facilitated and railroad efficiency been increased.

10. *Issuing Through Bills of Lading from Western Points of Shipment to Atlantic and European Ports* by making the transportation contracts definite to the distant market, and providing a basis for raising money on the shipments, has greatly aided the development of our export trade, and thus added to railroad efficiency. It is now customary to ship grain and other products from Chicago and other Western trade centres to Liverpool, Glasgow and other foreign ports, and the through rate for transportation being known, the quotation of foreign markets regularly cabled becomes the basis of daily transactions requiring railroad facilities for their consummation.

With all the recorded increase in railway efficiency, there is still a demand, during every busy season, for more transportation facilities; from mine and mill, from quarry and field, the cry is: "Cars! cars! more cars!" So persistent has been this cry, from every quarter and pitched in every key, that it is not surprising that the railway managers have come to mistake the collateral symptons for the disease. The manufacturer or other producer realizes only that he wants cars in which to load his product; its transportation to destination does not so much concern him, hence his cry for "cars." Yet the writer ventures the opinion, and not for the first time, that what is needed is not so much "more cars" as *more movement of cars.*

Freight blockades have been much more common of late than they were ten years ago, and they indicate clearly that the cars are in excess of the facilities for their movement, whether of engines, tracks, yards or other terminal facilities.

While the increase of these must continue, the advances most needed are in mechanical details and in methods of administration, looking to obtaining a larger average mileage from the freight cars in use.

Just as the reiterated demand for cars leads to the conclusion that the building of additional cars will remedy the complaint, so, when blockades occur, the railway managers are led to conclude that more yard tracks will remedy that evil. It is as if a man with aggravated dyspepsia, finding his system suffering from a lack of nutrition, should take more food; and then, having his stomach uncomfortably full, should conclude that he needed more stomach.

A blockade of freight is a traffic indigestion, and the remedy is not in more cars, but in less; not in more tracks to stand cars on, but in *less standing cars.* When cars are in trains, moving on the main tracks, they seem to disappear, and cease to be a cause of embarrassment; and in that direction lies the remedy.

It remains, then, to consider what is needed to apply the remedy and make it efficacious.

In proof of the statement that the greatest defect is in the movement, I will adduce the following facts, showing the decrease in their average movement that has taken place since 1868 and 1876. The facts in this regard are not easily accessible, as many railway companies keep no record of freight car mileage; many of those that keep such record make no separation of the mileage of their own from that of foreign cars; while but few make any mention of it in their reports.

By the courtesy of the officers of the Pennsylvania Company, I am enabled to present the following comparison of average miles run by cars owned by that company, they having furnished me with the data for the mileage of Pittsburgh, Fort Wayne & Chicago Railway Company cars during the twelve months ending June 30th, 1882, and of their Union Line cars in 1876 to 1882, while from a report made by myself while connected with the Pittsburgh, Fort Wayne & Chicago Railway I get the data for 1868.

MILES RUN BY PITTSBURGH, FORT WAYNE AND CHICAGO RAILWAY CARS.

During 1868:	Average, 14,923 miles.	Per secular day,	47.67
" 1881-'2	" 11,806 "	" "	37.72
Decrease, 21 per cent.,	3,117 "	" "	9.95

This decreased average mileage is in the face of better facilities in an important respect for making an increase; for in 1868 the Pittsburgh, Fort Wayne & Chicago cars were not run east of Pittsburgh, while since 1870 they have run to the Atlantic seaboard cities, giving them maximum runs of nearly double the length of those of 1868.

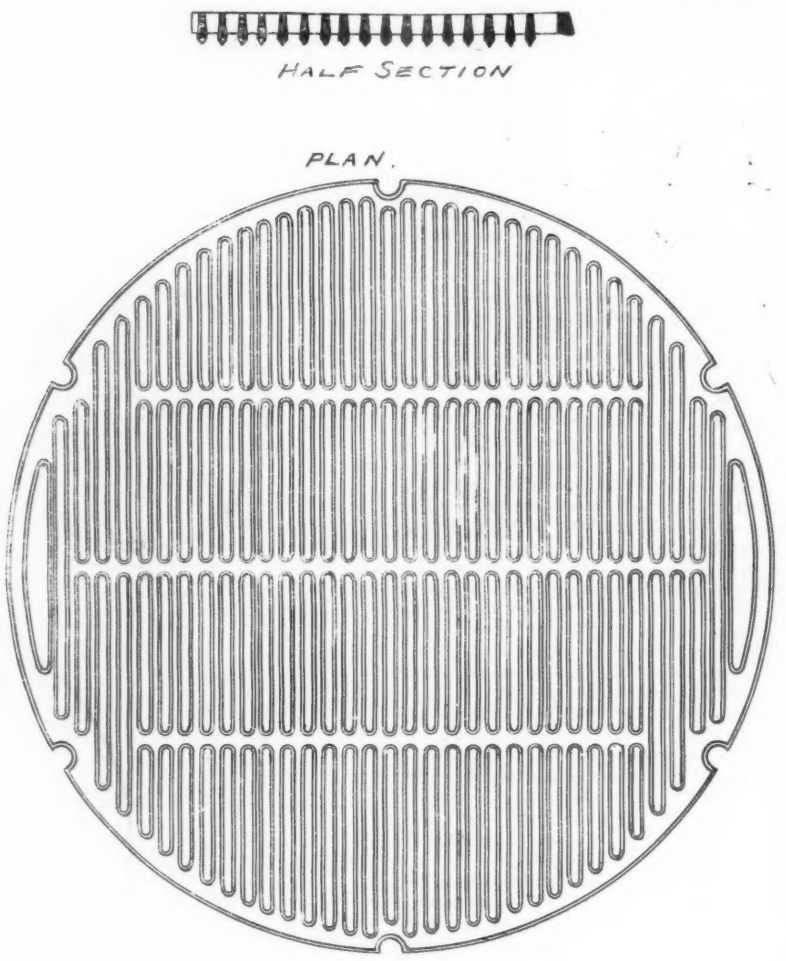

Fig. 2.

GRATING FOR ANTHRACITE COAL-BURNING LOCOMOTIVE CHIMNEY.

MILES RUN BY UNION LINE CARS.

	No. of cars.	Average miles.	Per secular day.
1876	3,983	27,811	88.85
1877	3,800	22,638	72.42
1878	3,828	24,672	78.82
1879	4,052	24,904	79.57
1880	4,689	19,359	61.85
1881	5,843	16,788	53 64
1882	6,041 for 8 mo's	9,353	44.82

These figures show that during 1877, '8 and '9, when the number of cars remained nearly stationary, the average mileage did not change materially, while with the steady increase in the number of cars from 1880 to 1882 there is a more than correspondingly decreased average mileage. While the number of cars in the years 1879, '80, '81 and '82 were respectively as 1, 1.16, 1.44 and 1.49, the average of miles run per secular day in 1879 bore to that of 1880, '81 and '82 respectively, the proportion of 1.29, 1.48 and 1.77 to 1.

It is not, however, to be inferred that these facts indicate cause and effect exactly, but they do indicate that from some cause which must be remediable, the average movement of cars has decreased more rapidly than the average number has increased, so that in the case of the Union Line the aggregate miles run in 1879 with 4,052 cars is greater than the aggregate movement in 1882 with 6,041 cars, estimating the movement in 1882 on the basis of the figures given for eight months, viz.:

In 1879	4,052 cars made mileage of.....		100,911,133
" 1882	6,041 " estimated mileage of.		84,752,667
Increase in cars	2,011	Decrease in miles.....	16,158,466
" "	49 per cent.	" "	16 per cent.

It is claimed by the officers of some of the railroads engaged in the movement of these cars that the decreased movement is due mainly to two causes, viz.:

1. The greater extent to which Union Line cars are used in local traffic.

* The experiments of Mr. P. H. Dudley with his "dynagraph" car show that a speed for freight trains of 18 miles per hour requires less power and is more economical of fuel than a slower rate of speed.

2. The use of the cars in transporting coal and coke westward; whereas they formerly ran westward empty.

That both of these causes have operated to produce the effect referred to cannot be doubted; but they do not and cannot account for all, nor nearly all, the decrease.

In 1868 the mileage of empty cars on the Pittsburgh, Fort Wayne & Chicago Railway was but 17.4 per cent. of the total car mileage, and in 1881 it had been reduced to 13.2 per cent.; but in 1868 the local traffic of the Pittsburgh, Fort Wayne & Chicago Railway was done almost wholly in Pittsburgh, Fort Wayne & Chicago cars, while in 1881 much of it was done in Union Line and other cars. Yet the average miles run by Pittsburgh, Fort Wayne & Chicago cars decreased since 1868, as stated, 21 per cent. Again, this decreased movement has arisen in the face of greatly increased capacity of locomotives, greatly increased average movement of locomotives and greatly increased demand for transportation. To what, then, the great decrease is due, and how it is to be remedied so that the average movement of all freight cars shall be, as it can and should be, at least fifty (50) miles per day, and of "line cars," such as the "Union Line," at least seventy-five (75) miles per day, is what I propose to show, under the following heads:

1st. *The necessity for more main tracks*, which can be met gradually by the extension of sidings and the building of sections of additional main tracks. This is generally appreciated by the officers of the transportation departments and receives attention if the financial condition of the company admits.

2d. A need that is more frequently neglected is that of *more locomotives*. Of course, much more can be done with the existing motive power of most railroads by adopting the system of running now used on the New York Central & Hudson River and Pennsylvania railroads, as hereinbefore detailed, whereby the average miles run by locomotives can be increased from 30 to 50 per cent. But upon many railways the number of cars is largely in excess of the motive power capacity for their economical movement. A careful investigation of the car capacity, as compared with the engine capacity, would show that some companies could afford to sell cars and buy engines with the proceeds, for manifestly when cars are in excess they only embarrass the movement of such as could otherwise have been moved promptly. I remember a case, within my personal knowledge, where the general manager of a railroad which had no excess of locomotives, but a deficiency, ordered ten (10) engines and one thousand (1,000) freight cars. The capacity of each engine was to haul about twenty (20) cars, and if each engine averaged 100 miles per day (31,300 miles per annum, which is large mileage for freight engines) the aggregate car mileage capacity was

$$\underset{\text{Car miles.}}{10} \times \underset{\text{Cars}}{100} \times 20 = 20{,}000 \text{ car-miles per day.}$$

Now, $20{,}000 \div 1{,}000 = 20$ miles per car per day; so that the 10 engines provided for an average movement of 20 miles per day for the 1,000 cars. As engines then cost about $10,000 each, and cars, say, $600 each, the money expended was, say:

For 10 engines at $10,000 each	$100,000
For 1,000 cars at $600 each	600,000
Total	$700,000

Assuming a movement of 50 miles per day as possible and reasonable, this amount of money could have been expended to much better advantage by the purchase of

20 engines at $10,000 each	$200,000
800 cars at $600 each	480,000
Total	$680,000

Then $\underset{\text{Car-miles.}}{20} \times \underset{\text{Cars.}}{100} \times 20 = 40{,}000$ car-miles per day, and $40{,}000 \div 800 = 50$ miles per car per day, whereas in the case cited if 400 cars were sufficient to economically employ the 10 engines purchased, not only was the expenditure for the additional 600 cars a waste, but the cars themselves had to stand around on yard tracks and sidings, requiring additional switching engines to handle them and impeding and thereby lessening the possible movement of the 400.

3d. The increased movement of cars will require *more trains*, which will make it necessary for trains to follow more closely.

On some parts of the Pennsylvania Railroad double trains are run, sometimes with two locomotives in front and sometimes with one at each end. It is economical in some respects, but it is open to the radical objection of having two persons in control with equal power, with all its attendant evils; and while one may be nominally in command much mischief may be, and often is, done before his designs or intentions can be communicated to the other. I do not believe that, on the whole, it is economical or desirable.

What is wanted is:

(*a.*) A good automatic signal system, whereby short "blocks," operated by the trains themselves, may be used for freight trains; keeping them at least one mile apart when running at full speed.

(*b.*) A good train brake for freight trains, as nearly automatic as possible in its action.

Such a brake, combined with automatic block signals, would make rear collisions absolutely indefensible, and almost impossible.

4. *The making up of trains at the point where cars are loaded*, and at the terminal stations where cars are received from other railroads, is capable of being greatly improved. At all such points the cars, as brought into the train yard, should be so thoroughly assorted and classified that but one "shift" would be needed to separate all the cars for any one destination from the others. The rule is rather, so far as the writer's observation goes, that the cars are made up into trains just as they come into the train yard, and the train has to be "shifted over" at every successive "train yard" to detach the cars that belong there or that go thence by local train.

Designating the destination of cars by the letters *A*, *B*, *C*, etc., compare two trains of twenty cars each, made up as follows:

1. *A*, *A*, *B*, *A*, *C*, *A*, *B*, *B*, *C*, *D*, *C*, *A*, *A*, *C*, *A*, *B*, *D*, *D*, *C*, *D*.

2. *A*, *A*, *A*, *A*, *A*, *A*, *A*, *B*, *B*, *B*, *B*, *C*, *C*, *C*, *C*, *C*, *D*, *D*, *D*, *D*.

The first indicates such a train as usually made up. The second represents the same train made up to facilitate movement. This improvement is perfectly feasible and if strictly followed would greatly facilitate the movement of trains and therefore increase the movement of cars.

5. *The detention of cars at stations and private sidings* is a prominent cause of the small average car movement. It can only be remedied by a reasonable but adequate "demurrage" charge. The charge of $5 per day set forth as a penalty for car detention on many railroads is so manifestly unreasonable as to defeat itself. It is so seldom that it is actually collected. In this as in other infractions of law it is the certainty and not the severity of the penalty that tends to prevent the violation.

Low rates of transportation, coupled by contract with invariable charges for demurrage, reasonable in amount, but certain in collection, will solve this difficulty, and no other remedy known to the writer will effect its correction.

6. It is probable that the greatest loss from the non-movement of cars results from *their absence on foreign railroads*. Not only do many railway officials allow "foreign cars" to be used systematically in their local traffic, but they allow them to stand on sidings and in yards, and do no good to any one. A coal company owning 100 cars recently found but 42 of them in its own trade; the remaining 58 had been absent from a week to two months, and one was found in a furnace yard loaded with ore placed on it nine weeks before! An investigation made by the writer in 1869 showed that the cars of the Pittsburgh, Fort Wayne & Chicago Railway absent on other railroads in March and October, 1868, had made an average mileage, while so absent, of $20\frac{57}{100}$ miles per day, for which the Pittsburgh, Fort Wayne & Chicago Railway Company then received $1\frac{1}{2}$ cents per mile, or the munificent sum of $30\frac{3}{100}$ cents per car per day. The rate of "car mileage" has been since reduced, first to one cent, and then to three fourths of a cent per mile run, so that on the present basis the company would receive for similar mileage $15\frac{12}{100}$ cents per car per day. As my statements show a generally decreased movement of cars, it is not likely that the present average movement, when on foreign railroads, equals that found for 1868.

The only effective way to bring about a prompt return of cars to the railroad of the company owning them, is to make it the interest of the foreign company having them to return them to their owner, which it manifestly is not under present regulations.

This can best be effected by a *per diem charge for cars when on foreign roads.*

This idea is not new, and the writer does not claim it as his discovery; it has been repeatedly discussed by railroad conventions, and they have decided against it—not on the ground of its inherent injustice, or of any difficulty in its application, but simply because of the conservatism of the railway managers, and a lurking fear that if all did not adopt it, those that did would be discriminated against, in favor of the lines that adhered to the old system. That its adoption by a leading line, like the Pennsylvania, would result in much more than compensating advantages, I have no doubt, and that it would be speedily followed by other lines I feel as little uncertainty; while its adoption by the "Trunk Lines" is perfectly feasible, and would be a success from the outset, greatly to their advantage.

There is no other business that I know of in which the use of millions of dollars worth of property is entrusted by the owners to others, with liberty to use it as much or as little as they choose, to pay for its possession only on the basis of its actual use, and to account for its use without check or record being kept by its owners; yet such is the case with the interchange of freight cars. One of the advantages of this proposed basis of settlement for "car service" is the facility with which the accounts can be kept. Every junction or intersection becomes a "clearing house" where is kept the number of cars received from and delivered to the connecting road each day, and the balance, added to or deducted from the previous day's balance, gives the number of cars with which the connecting road is to be debited or credited for the day, at the "per diem" rate. It will probably be conceded by most railway officers that the "per diem" basis is the most equitable, but the important question arises—what shall be the rate? To this I unhesitatingly answer, the rate should be fixed from time to time, perhaps every 2, 3 or 5 years, on the basis of the *average economic value of the cars in use to their owners.*

By "average economic value," I mean the average capacity of cars to make "net earnings" when properly handled, there being no reason apparent to me why the owner of a car should let another use it for less than its value to its owner.

It must be apparent that this value will vary from time to time with the varying circumstances, such as:

1. Average capacity of cars.
2. Average rates obtainable for traffic as compared with its cost.
3. Average movement of cars.

To the question, what is the present "economic value" of the average cars in use, I reply as follows, viz.:

Taking the actual traffic, mileage and earnings of the most prominent parts of the Pennsylvania Railroad Company's system for 1881, and assuming the average miles run by cars on the three lines to be 37½ per day (approximately that of the Pittsburgh, Fort Wayne & Chicago Railway), the value of each car per day will be shown in its average daily net earnings as follows:

1881.	Penn. R. R.	P., F. W. & C. Ry.	P., C. & St. L. Ry.
Loaded car mileage...	216,572,441	98,096,632	37,292,500
Empty car mileage...	108,608,166	15,969,647	6,165,648
Total car mileage..1	325,180,607	114,066,270	43,458,148
Total ton-mileage..2	2,655,438,764	1,044,447,161	401,946,112
*Average tons per car.....3	tons 8 17-100	tons 9 16-100	tons 9 25-100
Net earnings per ton per mile.....4	cents 362-1000	cents 320-1000	cents 22-100
Net earnings per car per mile.....5	cents 2 957-1000	cents 2 93-100	cents 2 035-1000
Average miles per car per day.....6	Estd. 37½	Estd. 37½	Estd. 37½
Net earnings per car per day.....7	$1.11	$1.10	$0.76

Average of three railroads.....99 cents.

*This average differs from that shown in the company's reports, being an average for all cars run, loaded and empty, while the average load reported by the companies is of the loaded cars only.

The much greater traffic of the Pennsylvania Railroad and Pittsburgh, Fort Wayne & Chicago Railway would make the actual average over $1 per car per day, even on the low average movement of 37½ miles per car per day, and with the low average tonnage per car.

When we consider the present average car capacity as at least 15 tons, and on say 75 per cent. of loaded mileage, with an estimated movement of 37½ miles per day, and net earnings of $\frac{3}{10}$ cents per ton per mile, we would have as the economic value of each car per day

$$\underset{\text{Tons.}}{15} \times \frac{75}{100} = \underset{\text{Tons.}}{11\frac{25}{100}}, \text{ which} \times \underset{\text{Miles.}}{37\frac{1}{2}} \times \underset{\text{Cents.}}{\frac{3}{10}} = \$1.26\frac{5}{10}.$$

The "economic value" of an average freight car is probably between $1 and $1.25 per day under existing circumstances, and we will be justified in assuming that $1 per day would be as low a rate as could reasonably be fixed as a charge for demurrage, and for the use of cars when on foreign roads.

It will be objected to this rate that it amounts to $26 per car per month, which is much more than a fair interest on the cost of a car, plus the cost of maintenance, and that cars can be hired for $15 per month. To this I reply that—

1. Cars cannot be hired for $15 per month, to be returned the next day, next week, or at the pleasure of the party hiring them, as foreign cars are returned.

2. The interest on cost, plus the cost of maintenance, is no proper criterion.

A company having cars, when cars are in demand, does not wish and should not be obliged to provide cars on this basis for its less provident neighbors. If A has wheat, when wheat is in demand, and he can get $1.50 per bushel, it is no answer to his demand for that price for B to say that it cost but 50 cents per bushel to grow it, or that he can get all he wants next season for 75 cents per bushel.

The company that has providently secured an adequate supply of cars is entitled to their use or its value.

It may be further objected, that railway companies will not take cars from other companies, on the basis of paying for their use, all that they could earn net.

To this I reply—

1. That the average mileage upon which the rate of $1.00 per day is based, is low and can easily be greatly exceeded, by prompt handling, except in cases where the terminal road has a very short haul, and that the primary object to be secured is prompt handling and quick return of cars.

2. In cases where roads have short hauls, they can be compensated by a terminal charge, which is now done universally (as I understand) at New York. It will be necessary, in the near future, and will certainly be more equitable to allow terminals in all cases where traffic passes over two or more railroads.

To the further question, whether I propose that the owners of private cars be compensated for their use upon the same basis, I would answer—Yes! so far as the principle of a per diem rate is concerned, and No! in regard to the rate itself. The governing circumstances are so different, that one-half the rate per day, allowed for the use of foreign railroad companies' cars would probable be fairly equitable.

The adoption of the per diem rate will "pay" any company whose traffic is large and whose lines are scattered over as large a district as is covered by most of the leading systems, and that it will tend to increase the movement of freight cars is very apparent.

The president of a prominent railroad said to the writer over a year since, that the more cars they got the less mileage they averaged, and that the only consolation he had was that his neighbors did not "do so well" as he did. I think he should have said that his neighbors "did worse," than he, as neither of them could be said, in the light of the above facts, to have "done well."

This is consolation that does not console!

It must not be inferred that because I have made my statements from, and based my arguments on, the traffic and car movement of the Pennsylvania and Pittsburgh, Fort Wayne & Chicago Railway, and the Union Line, that their record is worse than that of other leading railways; on the contrary, I believe it to be equal to the best, and better than that of most of the railroads of the country; their facilities are certainly superior to most of their competitors, and their administration is certainly equal to any.

If, then, these things be true of the best of our railway lines, what must be the facts upon those less advanced in facilities and administration? It would certainly justify my postulate, that "what is wanted is not more cars, but more *movement of ours.*"

THE SCRAP HEAP.

Car Notes.

The Suspension Car Truck Manufacturing Co., at its recent annual meeting, elected the following directors: James W. Chisholm, Wm. H. Barnum, C. P. Huntington, Theodore Houston, Grinnell Burt, D. B. Halstead, John Goldthwaite, Samuel Bancroft, A. B. Pullman, Aaron French, A. Hegewisch. The board elected James W. Chisholm President; Samuel Bancroft, Jr., Secretary; D. B. Halstead, Treasurer. Several well known names appear in the board.

J. G. Brill & Co., of Philadelphia, have taken an order to build 5 first-class passenger cars, excursion cars and 9 baggage cars for the Buffalo, New York & Philadelphia road.

The Barney & Smith Manufacturing Co. in Dayton, O., has just delivered two very handsome chair cars to the Cincinnati, Indianapolis, St. Louis & Chicago road. Three new passenger cars with all the latest improvements, including ladies' and gentlemen's wash-rooms, have just been delivered to the Cleveland, Columbus, Cincinnati & Indianapolis road.

The Buckeye Car & Manufacturing Co., a new organization, has bought the Timms Car Work's property near Columbus, O., and will at once put the shops in good repair, and ready for building cars.

Bridge Notes.

The Wrought Iron Bridge Co. in Canton, O., has taken a contract to build bridges over the James River at Jackson and Eagle Rock in Botetourt County, Va., for the Richmond & Alleghany road.

Iron Notes.

The Pittsburgh iron manufacturers having refused to recede from their demand for a reduction of 10 per cent. in wages, and the Amalgamated Association adhering to its determination to accept nothing less than last year's scale, a general strike in the Pittsburgh District appeared inevitable. There are many opinions as to its probable duration, which are, of course, of very little value. The strike will probably extend throughout Ohio as far West as Cincinnati, although some of the Ironton and Cincinnati mills may continue at work under an agreement to adopt the Pittsburgh scale, whenever that may be decided on. The Wheeling mills will generally stop work.

The Steubenville Iron Works is the name of a corporation just organized at Steubenville, O., which has bought the rolling mill at Allikanna, O. The capital stock is $150,000.

Summer Brothers & Co. are running their rolling mill at Strikers, O., full double turn on sheet and plate iron.

It is said that the Portsmouth Iron & Steel Co. will remove its rolling mill from Ironton, O., shortly.

Manufacturing Notes.

The Dickson Manufacturing Co. in Scranton, Pa., is building a boiler of unusual size for the Calumet & Hecla Mining Co., in the Lake Superior copper region. The boiler is 90 in. in diameter, 36 ft. long and will have 190 tubes, 3 in. in diameter. The shell is of ¾ in. steel plates. It is to carry 150 lbs. pressure in ordinary use, and will weigh about 54 tons.

The Lake City Tool Co. has been organized in Madison, Wis., to build machine tools and wood-working machinery. The company is now building its shops.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subject pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage*

THE BROOKLYN BRIDGE.

The New York & Brooklyn Bridge, which was opened to travel last week, is notable as an instance of an enormously expensive structure to provide for passages which individually are of infinitesimal value. The journey between New York and Brooklyn may be made by ferry boats for a cent during the four hours of the day when most people cross, and for two cents at other hours. To add one to the numerous crossings heretofore possible at that rate a structure has been erected which cost $16,000,000 and has been about 15 years under construction—doubtless one of the most notable engineering structures of all time. For this expenditure we have what is substantially one mile of highway, not serving to unite tens of thousands of miles of railroad on either side, like the St. Louis Bridge, which approaches it most nearly in cost, but almost exclusively to serve for ordinary street traffic between two cities, or, more properly, between parts of one city. It is the enormous number of services and not their individual value that has caused the erection of this costly work.

The nature of the work which this bridge performs is such that it can hardly be estimated beforehand. On its face it would appear that the expense could not possibly be justified by the service to be performed. The bridge does nothing which is not already done rapidly and cheaply: it adds one to several routes between New York and Brooklyn. As yet it does not afford transportation, but only a road, but when its cable cars are running the transportation which they afford will probably not be more rapid and certainly will be more costly to the carrier than the transportation afforded by the ferry boats. The route will be shorter than any ferry to passengers from certain parts of Brooklyn to certain parts of New York, just as every ferry route is more direct for some; and it will save going down one hill and up another for much of the traffic, which will be an advantage for teams especially. Moreover it will have the great advantage of being uninterrupted at all times, while there are a few days in severe winters when the ferry boats are more or less delayed by ice gorges. Yet the slight advantages which the bridge offers—slight, that is in the case of each separate passage—are likely to give it an enormous travel, though so far as at present appears, not nearly enough at ferry prices to pay interest on its cost.

The bridge, however, makes possible such a connection between the two cities as may draw across an enormously greater traffic that the present arrangements seem likely to give. It supplies a roadway over which it will be possible to run cars *through* from one city to the other. Only in this way can a considerable saving of time be effected by the bridge. The cable road which will soon be opened over the bridge will not provide this. Passengers will change from the street cars in Brooklyn to the bridge cars, and from the bridge cars in New York to the street or elevated railroad cars. The delay will be about the same as at the ferries, and the delay and annoyance are a very considerable objection to the journey, as is found on routes which are many hours long, even. If the passenger could get into a car near his home in Brooklyn, and be carried in it to his destination in New York, the route would offer a great advantage over any ferry to all except those going to places in New York quite near the ferries. And if cars of an elevated railroad in Brooklyn should be run through over the bridge and the elevated railroad in New York, then Brooklyn would truly be made a part of New York, and the bridge would be of enormous advantage to it. Its beautiful sites for dwellings, now accessible only by a wearisome journey of an hour or an hour and a half, would be brought within half or three-quarters of an hour of Union Square, and a very large part of the objections to living in Brooklyn, which have caused rents there to be less than half as great as in equally handsome parts of New York, would be obviated. For in spite of its immense population, Brooklyn is still substantially a suburb. Its people buy their goods and find their entertainment very largely in New York, as they do their business there. The obstacle which does not prevent the man's going to and from business in New York does prevent him and his family from attending theatres, concerts, public meetings, and visiting in New York in the evening, the more so as the latter require them to go up town in New York, some miles further than his place of business, perhaps. The social or semi social privileges determine the place of residence of a very large number of people, and especially of the wealthy. They live in the city for the sake of city privileges—because they can have *the best* of many things which are attainable only in a centre of civilization. The particular centre in this country is above Union square, in New York. If it can be reached from any spot otherwise desirable as a residence by an easy ride of three-quarters of an hour or so, at almost any minute, that place has the full benefit of the advantages of New York city; if the journey is long, interrupted by changes of cars or ferries, or otherwise uncomfortable, or can be made at only a few times in the evenings (as from most suburban towns), that place has the advantages of New York in a very limited degree. The whole difference is manifest in the rents: a house near Prospect Park in Brooklyn, a location unexcelled for beauty of situation, orderliness and cleanliness, will not bring more than half the rent commanded by a similar house in a handsome and not especially fashionable location in New York. Bring it within half an hour of Madison square and the values will certainly be much more nearly equal. The building lots in Brooklyn, now 30 minutes or more from Fulton Ferry, would probably double in price—much more, very likely—should such rapid transit between the two cities be provided.

And such rapid transit the bridge makes possible, as the ferries never could do. It is not at present proposed to run any through cars, it is true, and there is no elevated railroad in Brooklyn on which to run them. But it is so certain that only a small part of the advantage of the bridge can be attained if there must be a transfer at each end of it, and the owners of real estate have so many millions and tens of millions to gain by the running of through cars, that we confidently expect that it will be done at some time, and that then first will really great usefulness result from this magnificent structure, which is one of the great monuments of the New World.

THE BREAKAGE OF CAR-WHEELS.

In the *Railroad Gazette* of April 20 of this year we published some reports of the breakage of cast-iron car-wheels on several railroads during one month. These reports were made by the car-builders of different roads who meet at Buffalo especially to consider this subject, and those who made the reports kept careful account of the wheels removed on all their lines for the period, one month, covered by the reports. In the comments upon them it was pointed out that there was an element of uncertainty in the data from the fact that the wheels removed were taken from foreign cars as well as those owned by the companies on whose lines the record was kept, and there was no way of knowing the relative number of the two kinds of cars. Another meeting of car-builders has been held since the one referred to, and at this second meeting another report was made of the wheels removed during the month of March of this year, on a prominent road, on account of being fractured. In this report the element of uncertainty referred to is removed, as the whole number of wheels in use by the different makers is given. The nature and number of the different kinds of fractures was also given, as shown in the following table:

CAUSE AND NUMBER OF BREAKAGES.

Cracked plate.	Cracked hub.	Cracked flange.	Cracked tread.	Cracked rib.	Broken tread.	Broken flange.	Broken.	Total number fractured.	Total No of wheels in service.
328	29	54	175	100	84	14	16	800	238,033

At the above rate 9,600 wheels would be fractured within a year, or a trifle over 4 per cent. The figures given before indicated that 5 per cent. of the whole number of wheels in use were broken annually. In the report from which the above table was compiled, the number of wheels in use made by different manufacturers and the relative proportion of fractured wheels for each was also given. The latter varies from one wheel in 1,040 to one in 35 fractured during the month.

It will be noticed in the above table that the broken wheels included in the first five columns are "cracked" wheels only. So long as a fracture is nothing more than a crack it is not liable to cause an accident, but a wheel with a piece broken out of its tread, flange or plate at once becomes dangerous. The number of cracked wheels given in the table is 686, and 114 are reported broken. These numbers are respectively 85 and 15 per cent. of the total number of breakages reported. Or, if the breakages are calculated at the same rate for a year, the annual rate of fractures which are not dangerous would be nearly 3½ per cent. of the wheels in use, and the dangerous breakages would be over ½ per cent. The total number of cars in use in the country is given in the last number of Poor's Manual at 667,819, so that it is quite safe to assume that they now number 700,000, or 5,600,000 wheels, and therefore that we have 28,000 *dangerous* broken wheels every year. It is hard to escape from these figures. It may be, of course, that the company on whose line the breakages which were reported occurred is using poorer wheels than the average, or that more wheels break in March than during other parts of the year. If the first is true the company referred to is of course very much to blame, but there is no evidence, unless it be the above figures, to show that the wheels in use on that line are better or worse than others. It may be that more than the average number of wheels break in March, but proof is needed. It is well known that more rails break in cold weather than in mild, but March is not one of the coldest months, although probably the previous cold weather leaves the track in worse condition in that month than at any other time of year.

In the article published April 20, a comparison was made with the failures of tires on British railroads as reported by the Board of Trade. Since then the report for the whole year 1882 has been received, and it records 1,091 failures of tires under cars. We have also received a letter from the Secretary of the Railway Department of the British Board of Trade, in which he says that of "the failures of tires in the return for the period referred to, a large majority were discovered on examination at stations or in sidings." It is not clear, though, whether the railroad companies are required to report all the broken wheel centres which they remove on account of fractures. That they do not report all of them is indicated by the fact that only a single broken wheel centre is reported for the whole United Kingdom for the year 1882. With the classification given in the table above the breakages of those portions of the wheels which would form part of the tire if a separate tire was used are given separately, so that we can compare the failures of those portions of our wheels with those of the tires of British wheels reported by the Board of Trade.

Cracked flanges, cracked treads, broken treads, broken flanges and broken wheels would correspond with the fractures of tires, if separate tires were used. The following are the failures of these parts reported in our table:

For month.	Calculated for year.			
54	648	Cracked flanges	= 1 in	367.3 per year.
175	2,100	Cracked treads	= "	113.3 " "
84	1,008	Broken "	= "	236.1 " "
14	168	Broken flanges	= "	1,416.9 " "
16	192	Broken wheels	= "	1,239.7 " "
343	4,116		= "	57.8 " "

Taking now the British reports, we have 1,091 tires which failed under cars in the year 1882. The number of wheels in use in the United Kingdom according to the last returns was 1,779,832, so that the annual rate of failure of tires was 1 in 1,631.3. As shown in the last table the rate of failure of the parts of cast-iron wheels corresponding to tires during the

month of March, on the line from which the report was secured, would be equal to 1 in 57.8 per year, so that the rate of failure of the parts named is, in proportion to the number of wheels in use, about *twenty-eight* times greater here than it is on British railroads! It must be kept in mind too, that in this comparison the failure of those parts of the wheels which are inside of the tire are not included, and that on the line from which the above statistics have been obtained there was a larger number of failures of wheel-centres than of the parts which would form the tires if there were any. Less than half of the American wheels reported failed in the treads and flanges.

The figures given indicate a very serious condition of things and one which must, or should, cause railroad managers and master car-builders to make it a subject for grave consideration, and it is because of its seriousness that we have been led to return to the subject again. If twenty-eight times as many cast-iron wheels are broken in the treads and flanges as would fail if steel or wrought-iron tires were used, it begins to be a serious question whether we will not be obliged to face the question of abandoning entirely the use of cast-iron chilled wheels, especially for passenger service. That the expense of doing so is a very serious objection to it is of course plain. If further investigation should confirm the deductions drawn from the data before us, and if no remedy for the apparent weakness of cast-iron wheels can be found, it may become necessary to abandon their use even under freight equipment.

We are quite well aware that the evil complained of is attributed by wheel manufacturers to the fact that railroad companies are unwilling to pay an adequate price for good wheels, and that the makers are compelled to put poor material into the wheels they make in order "to meet the market." If, however, we look at the question from the purchaser's side, we find that he is entreated to buy low priced wheels by makers who insist as strongly on the goodness of their wheels as those do who ask higher figures. How then is the buyer to know whether he is getting good, bad or indifferent wheels when he buys them? Here is the great difficulty—there is no reasonably sure way of testing wheels, and it by no means follows that by paying a high price a railroad company will get wheels which will stand well in service. As it is now, there does not seem to be any way by which a railroad company can know whether a lot of a hundred or a thousand wheels which it buys will or will not stand well excepting by using them. If there were some way the question would be a very simple one, as it would then only be necessary to have each lot of wheels received inspected, and if they did not come up to the standard they could be rejected. The fact that of the wheels made by one maker 1 in 35 failed, whereas of those made by another party only 1 in 1,040 broke, shows that there is a very great difference in the strength and resisting power of different kinds. The trouble now is that we can't tell, or railroad companies cannot tell, which are good wheels and which poor ones. If the difficulty of doing this is insuperable, that is, if no method can be devised which will indicate, at least approximately, before wheels are put into use, whether they are good or bad, strong or weak, then it seems probable that railroad companies, on account of their uncertainty, will be obliged to abandon their use, at least for that kind of service in which human life would be exposed to danger by their failure. The thing then that seems most essential for the manufacturers of cast-iron wheels to do, is to devise some effective method for testing and inspecting wheels. At present many of them are going about, lamenting that railroad companies are not willing to pay higher prices for the wheels they buy, and yet it is hard to see how the addition of a few dollars to the price of a bad wheel will improve it. The attitude which some manufacturers are assuming is that of admitting their wickedness in putting bad iron into their wheels, but they say if you will only give us a few dollars more for each of them, we will stop being wicked, and will use good iron. That railroad companies should regard the plea as rather attenuated, so long as they have no means of judging of the quality of the material in the wheels they receive, is not remarkable.

The cause of the evil complained of is not easy to point out. That poor material is one there can be little room for doubt. That cast-iron wheels, when made of the forms now in use, are subjected to a considerable degree of internal strain in cooling also seems very probable. Besides these causes, there is the other difficulty of making castings of uniform quality. Flaws will occur in spite of all the care that can be taken. The difficulty is not in making some good wheels, but in making all of them good; and as the case stands now, what is most needed is some means of distinguishing the good ones from the bad ones.

PROVISION EXPORTS AND PRODUCTION.

Exports of provisions in April this year were in value 18 per cent. greater than last year, but for the four months ending with April they were but 2 per cent. greater, there having been a decrease until April. But the large percentage of gain in April was not due to large shipments this year, but to very small ones last year. This it is important to understand. We have heretofore called attention to the comparatively slow growth of agriculture of late years, while almost all other industries and the population itself have been increasing at a tremendous rate. The growth of population alone would have required us to keep a much larger amount of our farm produce for home consumption than heretofore; but this home consumption has been greatly stimulated by the great and general prosperity. There can be no doubt that the average consumption per individual of such articles as meat, butter, cheese; etc., has been much greater since 1878 than it had been for several years previous, and this has tended to diminish exports. The better average standard of living, too, has tended to diminish the production of the great staples of export, because the farmers have been called upon for more of the smaller products, such as poultry and other articles more costly than bread and pork or beef, which are scarcely exported at all.

As the large increase in value of exports in April over last year, and the general favorable comparison of this year's provision exports with last year's leads many to suppose that our exports are positively large, we have compiled a statement of them for five successive years, from which it appears that in April the aggregate exports of cattle products (butter, cheese, fresh and salt beef and tallow) and of hog products (bacon, hams, pork and lard) have been, in pounds,

	1879.	1880.	1881.	1882.	1883.
Cattle products	31,798,383	28,480,376	24,561,851	16,418,039	23,048,531
Hog products	101,085,109	141,573,072	63,215,323	45,125,874	46,749,036
Total	132,883,492	170,053,448	87,717,174	61,543,913	69,797,567

When we compare this year with last, we find an increase of 13¼ per cent. This seems very satisfactory until we find that the exports this year were 23 per cent. less than in 1881.no less than 60 per cent. less than in 1880, and 48 per cent less than in 1879. That is, the exports this year were really very small. The increase over last year was almost entirely in cattle products, and chiefly in fresh beef, of which the exports increased 138 per cent., making them very nearly as large as in 1881, when they were greatest.

It will not do to estimate the general situation by the exports of a single month, however, and therefore we have compiled these provision exports also for the four months ending with April. We give these in more detail, as follows:

	1879.	1880.	1881.	1882.	1883.
Butter	18,740,737	7,807,995	6,765,301	1,927,543	5,377,932
Cheese	67,491,863	14,248,802	24,460,039	19,336,243	10,456,710
Fresh beef	23,827,815	35,36 ,505	39,830,514	23,815,878	38,673,635
Salt beef	13,191,391	15,441,869	13,464,571	18,350,408	17,214,408
Tallow	37,483,981	35,988,3 6	28,777,303	18,756,912	15,659,078
Cattle products	166,777,707	108,756,567	111,798,128	82,187,064	87,380,863
Bacon and hams	330,985,780	297,277,595	3 2,340,030	162,633,208	163,726,684
Lard	120,151,636	143,064,702	132,139,328	86,153,744	76,197,549
Pork	30,174,738	31,2 1,985	43,269,732	30, 90,757	24,916,112
Hog products	481,312,154	471,484,282	477,749,090	278,877,709	264,840,385
Total	642,089,861	580,240,849	589,547,218	361,064,773	352,221,248

If we look at the totals first, we shall see that general *course* of the exports differs from that shown before for April only in hog products in 1881. There was a great decrease in these in April, but not for the four months. But for the last two years the exports have been very much less than before: the total of both cattle and hog products was but 2½ per cent. less this year than last, but it was 40 per cent. less than in 1881 and 45 per cent. less than in 1879—truly an enormous decrease to be made in one of our three leading exports, and deserving serious consideration.

It should be said first of all that a very large part of the decrease in the exports of hog products was certainly due to smaller production. We know what the production has been, and that the number of hogs packed has fallen off enormously in the last two years. There was good reason for this decrease in the reduction of the corn crop from 1,717 millions of bushels in 1880 to 1,180 in 1881, while last year the crop, while a great improvement over that of 1881, was much less than in 1879 and 1880, and was light especially in the chief hog-growing states. But the whole of the decrease in exports was probably not due to this; there has doubtless been a larger domestic consumption.

We may neglect the hog products entirely, however, and look for confirmation of the theory of a great increase in home consumption to the exports of beef, tallow and dairy products. The production of these was not greatly affected by the failure of the corn crop, and raising cattle is doubtless the one farming industry which has grown fastest in the last six years. The vast plains between the 100th meridian and the Rocky Mountains, formerly desolate, are now so occupied with cattle ranches that it is hard to find a new location, except in the extreme north. Western Nebraska and Kansas, the Indian Territory, New Mexico, Colorado, Wyoming, Montana, and even territories further west send hundreds of thousands of cattle to market yearly to reinforce the other hundreds of thousands which have been coming from Texas for a much longer period. Dairies have multiplied in several of the Northwestern states. We have not definite statistics, but unless there has been a great reduction in the number of cattle east of the Missouri, there must have been a great increase in the total number in the country, and if there has been a great reduction in the older states, it is difficult to see what has taken the place of the cattle, as they have not increased the area on which grain is grown. But we see that the maximum exports of cattle products were in 1879, and that this year they were 46 per cent. less than then, and 22 per cent. less than in 1881. Of butter the exports this year were not one-third, and of cheese not one-fourth the 1879 exports. In these dairy products perhaps are the strongest indications of a greater *average* consumption. these being articles which the poorer classes economize greatly in when their incomes are reduced. A comparatively trifling increase in the average consumption will dispose of the largest exports of beef and dairy products that we ever have made, and there is little doubt that our production of these is now greater than ever before. With dullness in business, suspensions of iron works, short time in manufactories, a suspension of railroad construction and less other building we would probably see it very plainly in the exports.

It is a very comfortable condition of things, when we are able to consume all the good things we produce besides many imported from abroad, but it is not by any means certain that we have not been recently consuming more than we can, on the average, afford to—whether we shall not have to live less well and sell more abroad to make both ends meet. The great industrial activity of the past few years has made the average income exceptionably great. This will not last always, and when the incomes are reduced the average consumption will be reduced also. This doubtless will affect manufactures more than farm products, but it will affect the latter considerably. It will not lessen the production of the staple products, however, but will increase the exports of them, and when other industries have been readjusted so that there is a good demand for all that they produce and the rest of the population is engaged in agriculture the foundation will have been laid for general prosperity again.

Pennsylvania Earnings and Expensss in April.

Pennsylvania Railroad earnings and expenses in April, as reported for all the lines worked by the company east of Pittsburgh and Erie, show this year an increase over last of $205,900 (5.3 per cent.) in gross earnings, of $57,380 (2.4 per cent.) in working expenses, and of $148,520 (11.3 per cent) in net earnings. For eleven successive years the earnings and expenses of these lines in April have been.

Year.	Gross earnings.	Expenses.	Net earnings.
1873	$3,613,045	$2,454,309	$1,158,736
1874	3,217,701	2,103,433	1,114,268
1875	2,775,836	1,690,399	1,085,497
1876	2,862,722	2,025,847	836,875
1877	2,346,704	1,765,148	581,556
1878	2,509,805	1,632,509	877,297
1879	2,630,023	1,598,995	1,031,028
1880	3,488,367	1,992,785	1,495,582
1881	3,760,372	2,104,562	1,655,810
1882	3,855,850	2,536,539	1,319,311
1883	4,061,750	2,593,919	1,467,831

Thus the gross earnings in April this year were larger than ever before, and there has been no interruption to the growth since 1876. Since 1880, which for the railroads as a whole was their most prosperous year, the increase has been 16½ per cent.; since 1879 it has been 54 per cent. The increase in expenses since last year is very little, but since 1881 it is 23 per cent., and the expenses this year in April have never been exceeded except in March of this year and in May and June of 1873. The net earnings, though a ninth larger than last year, were a ninth less than in 1881, and a little less than in 1880.

In view of the restriction of activity in some of the iron industries, which give this road such an enormous traffic, it is encouraging to find that it has been able to make any gain in earnings. Its through traffic was doubtless much more remunerative than last year.

The lines controlled by this company west of Pittsburgh and Erie during April earned a surplus over all liabilities for interest, rentals, etc., of $149,710 this year, against $5,015 last year. The average gross earnings of this system, it should be remembered, were more than $2,500,000 a month last year, and it requires comparatively a trifling change in the figures to make such a gain as is here reported for April, which is not so large as in January or March, while there was a deficit in February.

For the four months ending with March the system east of

Pittsburgh and Erie reports an increase over last year of $1,444,488 (10 per cent.) in gross earnings, of $602,478 (6.3 per cent.) in working expenses, and of $842,010 (17.2 per cent.) in net earnings. For seven successive years these have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1877	$9,184,566	$6,400,006	$2,784,560
1878	9,446,089	6,100,062	3,346,027
1879	10,312,564	6,103,785	4,208,779
1880	12,794,681	7,189,570	5,605,111
1881	13,889,508	8,069,704	5 819,804
1882	14,448,219	9,559,415	4.888.804
1883	15,892,767	10,161,893	5.730,814

There has been an uninterrupted increase in gross earnings since 1876, and this year they are 10 per cent. more than last year, 14½ per cent. more than in 1881, 24½ per cent. more than in 1880 and 54 per cent. more than in 1879 This enormous gain following the revival of manufacturing business has been equaled on but few roads at any time, and these usually new ones in country suddenly occupied and developed.

The working expenses have more than kept pace with the earnings since 1879, however. In 1880 they were but 56.2 per cent. of the earnings. This year they were 64 per cent. While the increase in gross earnings has been $3,098,000 (24½ per cent.) that in expenses has been $2,972,000 (41 per cent.), leaving the gain in net earnings but $125,700 (2¼ per cent.) The net earnings this year, however, are larger than in any other except 1881, and only $89,000 less than then.

The surplus over all liabilities of the lines west of Pittsburgh and Erie for the four months was this year $385,866, against $7,271 last year. This, with the increases in net earnings of the eastern system, makes the gain in profits for the four months this year $1,220,605, which is more than 1⅛ per cent. on the stock as it will be with the increase made with the last dividend, and is 18 per cent. on all the *increase* of stock made within a year. It should not be taken for granted, however, that there has been and will be no increase in interest charges or rentals, on the one hand, or that there will not be an increase or decrease in the income from the securities which this company holds in other roads. The calculation is made not to show what surplus available for dividends the company has accumulated so far, but how far the part of the increase of profits that is reported will go.

The western system, though doing better than last year, can hardly be said to have done well this year. Its surplus over liabilities for the four months for five successive years has been :

1879.	1880.	1881.	1882.	1883.
$52,783	$1,317,177	$1,409,311	$7,271	$385,866

Thus, though so much more this year than last, it was more than a million *less* than in 1881, and nearly a million less than in 1880. This surplus, together with the net earnings of the eastern system, does not show so great a gain as the latter alone, being as follows for five years :

1879.	1880.	1881.	1882.	1883.
$1,201,512	$6,922,288	$7,229,115	$1,896,075	$6,116,680

Thus the profits this year, though so much more than last year, are $1,112,500 less than in 1881, and $805,600 less than in 1880, which should be borne in mind when considering the uninterrupted increase in the gross earnings of the eastern system.

So far as the increase in net earnings this year has been due to poor earnings last year, the time is past with April. In each of the first four months of 1882 the net earnings were much less than in 1881, and less than in 1880; but after April and until December there was a gain every month, and in each of these months the net earnings were larger than in any month yet this year—often much larger. It is extremely improbable that the gross earnings this year will more than equal those of these exceptionally favorable months of last year; but a reduction in expenses may give an increase in net earnings. Should there be a period of idleness among the iron works, a decrease would not be at all surprising, and with the fine start the company has made, would not be at all alarming or embarrassing.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Bellaire, Zanesville & Cincinnati.—Extended from Woodsfield, O., west to Louisville, 8 miles. Track also laid from Zanesville, O., east 5 miles. Gauge, 3 ft.

Jacksonville, St. Augustine & Halifax.—Extended southeast to St. Augustine, Fla., 19 miles. Gauge, 3 ft.

Jersey Shore, Pine Creek & Buffalo.—This road is 9.8 miles longer than heretofore reported.

Michigan & Ohio.—Extended eastward to Augusta, Mich., 10 miles.

New York, West Shore & Buffalo.—The *Albany Branch* is completed by laying track from Normanskill, N. Y., north 4 miles.

Northern Pacific.—Extended from Gallatin, Mon., westward 40 miles; also from Third Crossing, Idaho, east to Jocko, 15 miles.

Oregon Railway & Navigation Co.—The *Baker City Branch* is extended from Pendleton, Or., southeast to Mikeeha, 10 miles.

Rochester & Pittsburgh.—The *Buffalo Branch* is completed by laying track from Colden, N. Y., southeast to Cattaraugus Bridge, 12 miles.

This is a total of 132.8 miles of new railroad, making 1,593 miles thus far this year, against 3,203 miles reported at the corresponding time in 1882, 1,480 miles in 1881, 1,519 miles in 1880, 619 miles in 1879, 407 miles in 1878, and 461 miles in 1877.

RAILROAD EARNINGS IN APRIL.

Name of Road.	Mileage.					Earnings.					Earnings Per Mile.				
	1883.	1882.	Inc.	Dec	P.c.	1883.	1882.	Increase.	Decrease.	P. c.	1883.	1882.	Inc.	Dec.	P. c.
						$	$	$	$		$	$	$	$	
Ala. Gt. Southern	290	290	....	....	....	72,625	57,007	15,618	....	27.4	250	197	53	....	27.4
Atch., Top. & SantaFe	1,820	1,804	16	....	8.8	1,162,403	1,164,435	....	1,032	0.2	639	645	....	6	0.9
Bur., Ced. Rap. & No.	714	645	69	....	10.7	218,252	178,304	39,918	....	22.4	306	276	30	....	10.7
Central, of Ga	726	712	14	....	1.9	194,000	158,711	35,889	....	22.6	268	223	45	....	20.2
Central Iowa	244	244	....	....	....	100,805	82,044	18,761	....	22.9	413	335	78	....	22.9
Central Pacific	2,941	2,917	24	....	0.8	2,035,000	2,054,687	....	19,687	0.9	692	698	....	6	0.9
Ches.& Ohio	517	435	82	....	18.9	279,660	267,454	12,206	....	4.6	541	615	....	74	12.2
Eliz., L. & Big San.	130	130	....	....	....	54,280	36,240	18,040	....	49.8*	418	279	139	....	49.8
Chicago & Alton	850	850	....	....	....	584,981	564,860	20,121	....	3.5	688	665	23	....	3.5
Chi. & Eastern Ill	245	245	....	....	....	123,037	123,881	....	844	0.7	502	506	....	4	0.7
Chi., Mil. & St. Paul	4523	4,260	263	....	6.2	1,972,000	1,517,569	454,431	....	29.8	436	356	80	....	22.5
Chi. & Northwestern	3,590	3,250	340	....	10.4	1,742,900	1,668,741	74,159	....	4.4	486	573	....	27	5.3
Chi., St. P., M. & O	1,230	1,009	221	....	22.0	419,535	377,288	42,247	....	11.2	341	374	....	33	8.9
Chi. & West Mich	404	367	37	....	10.1	93,353	95,640	....	2,287	2.4	231	261	....	30	11.5
Cin., Ind., St. L. & Chi.	384	384	....	....	....	196,371	194,474	1,897	....	0.9	511	506	5	....	0.9
Cin., N. O. & T. x. P.	336	336	....	....	....	171,019	166,239	4,780	....	2.9	509	495	14	....	2.9
Cleve., Akron & Col.	144	144	....	....	....	40,673	39,874	799	....	2.0	282	277	5	....	2.0
Denver & R. G	1,281	1,062	219	....	20.6	573,700	556,900	16,800	....	3.0	448	524	....	76	14.5
Des M. & Ft. Dodge	138	84	54	....	64.3	24,182	25,616	....	2,434	9.5	168	305	....	137	45.6
Det., Lan. & Nor	226	226	....	....	....	134,776	134,064	712	....	0.5	596	593	3	....	0.5
Eastern	284	284	....	....	....	246,964	258,149	8,815	....	3 4	940	909	31	....	3.4
E. Tenn., Va. & Ga	1,070	900	170	....	18.9	265,534	220,402	45,132	....	20.5	248	245	3	....	1.2
Evansv. & T. H.	146	146	....	....	....	56,123	65,272	....	9,149	14.1	384	447	....	63	14 1
Flint & Pere Mar	347	345	2	....	0.6	235,935	188,569	47,366	....	25.1	680	547	133	....	24.3
G'n B., Win. & St. P.	220	220	....	....	....	36,868	31,292	5,576	....	17.8	168	142	26	....	17.8
Gulf, Col. & S. F	483	370	113	....	30.5	120,064	66,461	53,603	....	81.2	249	180	69	....	37.2
Hannibal & St. Jo	292	292	....	....	....	193,481	158,113	35,368	....	22.4	663	541	122	....	22.4
Houston, E. & W. Tex.	120	88	32	....	36.4	24,884	24,131	753	36,627	3.1	207	274	....	67	24.8
Ill. Cen., Ill. lines	928	919	9	....	0.9	463,307	499,934	....	....	7.3	499	544	....	45	8.3
Iowa lines	402	402	....	....	....	160,040	140,080	19,960	....	14.3	398	348	50	....	14.3
Southern Div	578	578	....	....	....	265,084	247,529	17,555	....	7.1	458	428	30	....	7.1
Ind., Bloom. & West	695	555	140	....	25.2	215,912	205,934	9,978	....	4.9	311	371	....	60	16.2
Kan. C., L. & S. Kan	399	385	14	....	3.6	112,000	68,107	43,893	22,334	64.5	281	177	104	....	58.8
Lake Erie & Western	386	386	....	....	....	87,722	110,056	....	....	20.3	227	285	....	58	20.3
Little Rock & Ft. S	168	168	....	....	....	37,652	28,265	9,387	....	33.5	224	168	56	....	33.5
Litt'e Rk ,Miss. R. & T.	173	156	17	....	10.9	29,456	21,066	8,390	....	39.9	170	135	35	....	25.9
Long Island	354	335	19	....	5.8	170,215	159,197	11,018	12,474	6.9	481	448	33	....	7.3
Louisville & Nash	2,037	2,028	9	....	0.5	941,126	953,663	....	16,643	1.3	462	470	....	8	1.7
Marq.,Hought. & Ont.	97	88	9	....	10.2	17,276	33,919	....	....	48.9	178	385	....	207	53.7
Memphis & Charles	292	292	....	....	....	80,765	71,187	9,578	....	13.5	277	244	33	....	13.5
Mil., L. S. & West	325	275	50	....	18.2	84,184	67,523	16,661	....	24.5	259	246	13	....	5.2
Mo. Pacific lines :															
Central Branch	388	388	....	....	....	90,672	59,421	31,251	....	52.8	233	154	79	....	52.8
Int. & Gt. Northern	825	775	50	....	3.2	273,294	254,290	19,004	....	7.5	331	328	3	....	0.9
Mo., Kan. & Tex	1,374	1,207	167	....	13.9	510,042	444,205	65,837	....	14.9	371	367	4	....	1.1
Mo. Pacific	990	785	205	....	26.2	605,273	541,144	64,129	....	11.8	611	690	....	79	11.4
St. L., I. M. & So	882	719	163	....	23.2	544,796	579,978	....	35,182	6.1	618	807	....	189	23.6
Texas & Pacific	1,487	1,234	253	....	20.5	406,180	368,752	37,428	13,495	10.1	273	299	....	26	8.9
Mobile & Ohio	528	528	....	....	....	128,462	141.957	....	5,958	9.5	240	269	....	23	9.5
Nash., Chat. & St. L.	539	526	13	....	2.4	161,435	167,393	....	....	3.6	299	318	....	19	6.0
N. Y. & N. England	399	399	3	....	0.7	268,853	261,044	7,809	....	3.0	674	659	15	....	2.3
N. Y., Penna. & Ohio†	565	565	....	....	....	463,678	450,555	13,123	....	2.9	821	798	23	....	2.9
N. Y., Susq. & West	147	86	61	....	70.9	80,060	52,151	27,849	....	53.5	544	606	....	62	10.2
Norfolk & Western	428	428	....	....	....	190,396	171,793	19,203	....	11.2	446	401	45	....	11.2
Northern Central	322	322	....	....	....	476,335	420,490	55,845	....	13.3	1,479	1,306	173	....	13.3
Northern Pacific	1,700	972	728	....	76.4	675,200	451,023	224,177	....	49.7	397	464	....	67	14.6
Ohio Cent'al	284	232	52	....	22.4	67,986	84,448	....	16,462	19.5	267	364	....	97	26.9
Ohio Southern	138	128	10	....	7.8	29,720	29,040	680	....	2.3	215	227	....	12	5.3
Pennsylvania†	2,048	1,954	94	....	4.7	4,061,750	3,855,850	205,900	....	5.3	1,983	1,973	10	....	0.5
Peo., Dec. & Evansv.	254	254	....	....	....	60,059	67,084	....	7,025	10.5	236	264	....	28	10.5
Phila. & Reading	999	994	5	....	0.5	1,726,615	1,709,712	16,903	....	0.9	1,728	1,720	8	....	0.5
Rich.& Danville lines:															
Char., Col. & Aug.	238	238	....	....	....	52,954	48,203	4,751	....	9.9	222	202	20	....	9.9
Col. & Greenville	296	296	....	....	....	43,092	42,158	934	....	2.2	146	143	3	....	2.2
Rich. & Danville	773	766	7	....	0.9	267,409	266,139	1,270	....	0.5	346	347	*	1	0.3
Va. Midland	352	352	....	....	....	125,825	110,835	14,990	....	13.5	357	315	42	....	13.5
Western N. C.	190	165	25	....	15.2	21,766	16,194	5,572	....	34.8	115	98	17	....	17.3
St. L., A. & T. H.															
Main Line	195	195	....	....	....	103,045	97,965	5,080	9,676	5.2	528	502	20	....	5.2
Belleville Line	121	121	....	....	....	57,760	67,436	....	....	14.4	477	557	....	80	14.4
St. Louis & Cairo	146	146	....	....	....	30,759	26,830	3,929	....	14.6	211	184	27	....	14.6
St. Louis & San Fran.	725	660	65	....	9.8	274,011	242,806	31,205	....	12.8	378	368	10	....	2.7
St. Paul & Duluth	196	196	....	....	....	77,782	63,988	13,794	....	21.5	397	326	71	....	21.5
St. P., Minn. & Man	1,326	912	414	....	45.4	812,008	570,890	241,118	3,646	42.9	612	626	....	14	2.2
Scioto Valley	128	128	....	....	....	37,762	41,408	....	....	8.8	295	324	....	29	8.8
South Carolina	243	243	....	....	....	78,950	78,380	570	....	0.7	325	323	2	....	0.7
Union Pacific	4,693	4,327	366	....	8.5	2,199,231	2,362,004	....	162,773	6.9	469	546	....	77	14.1
Vicks. & Meridian	142	142	....	....	....	29,801	30,718	....	917	3.0	209	216	....	7	3.0
West Jersey	186	168	18	....	10.7	76,022	70,363	5,659	....	8.0	409	419	....	10	2.4
Total, 76 roads	54,776	50,194	4,622	....	....	29,167,270	27,329,364	2,217,451	379,545	....	532	544	....	12	.....
Total inc. or dec	....	....	4,622	....	9.2	....	....	1,837,906	....	6.7	....	....	....	12	2.2
SUPPLEMENTARY TABLES.															
Oregon Ry & Nav.Co.‡	2,150	1,960	190	....	9.7	396,200	379,433	16,767	....	4.4	189	194	....	5	2.6
Phila. & Read. Coal & Iron Co	....	....	....	....	....	1,193,001	989,994	203,007	....	20.7	....	....	....	....	....

* Not in table of earnings for the four months.
† Includes all lines east of Pittsburgh and Erie.
‡ Railroad, 575 miles; river and ocean lines, 1,575 miles.

CHICAGO THROUGH RAIL SHIPMENTS EASTWARD for the week ending May 21 for four successive years have been:

	1880.	1881.	1882.	1883.
Tons	29,067	52,888	24,556	26,677

The shipments this year were thus a little (8½ per cent.) more than in the corresponding week of last year, but little more than half as great as in 1881, and 9 per cent. less than in 1880. The differences are not noticeable, except in comparison with 1881, when the shipments were extraordinary for the season.

Of the shipments of the week this year 18.6 per cent. went by the Chicago & Grand Trunk, 18.3 by the Michigan Central, 16.1 by the Lake Shore, 27.2 by the Fort Wayne, 12.1 by the Chicago, St. Louis & Pittsburgh, and 7.7 per cent. by the Baltimore & Ohio. Thus the two Vanderbilt roads together carried 34.4 per cent., instead of the 45.5 which is their share, and the two Pennsylvania roads carried 39.3, instead of 35.5.

For seven successive weeks the Chicago shipments have been, in tons:

Week ending.						
Apr. 7.	Apr. 14.	Apr. 21.	Apr. 30.	May 7.	May 14.	May 21.
36,271	35,728	33,668	35,525	40,482	36,270	26,677

Thus in the last week there was a decrease of no less than 9,593 tons (26 per cent.) from the previous week, and the shipments were the smallest of any week since the middle of last August.

There was nothing very remarkable in this falling-off, however, unless it is that it was so late in coming. Rail shipments usually fall off largely after lake navigation opens, but this year the vessels have not taken so large a proportion of the grain as usual. The course of the shipments in successive weeks from the first of March to the first of July in different years will illustrate:

Week to	1880.	1881.	1882.	1883.
March 7	*54,355	*28.085	48,581	72,051
" 14	67,413	52,968	47,567	69,696
" 21	75,439	55,486	38,646	69,368
" 31	87,699	53,838	§32,447	57,094
April 7	*56,429	*53,020	*38,088	36,271
" 14	34,560	73,362	33,282	35,728
" 21	*37,522	68,110	30,270	¶33,668
" 30	30,?63	58,866	29,528	*35,525
May 7	27,000	*122,351	28,373	40,482
" 14	24,485	96,046	23,364	36,270
" 21	29,067	52,888	24,556	26,677
" 31	34,218	47,523	27,124	.....
June 7	32,403	40,029	26,762	.....
" 14	42,504	*37,600	28,514	.....
" 21	68,360	*54,266	28,753	.....
" 28	55.394	‡81,600	25,918	.....

* First week lake navigation was open.
† Strike of yard switchmen prevented shipments.
‡ First week of open railroad war.
¶ Rail rate reduced.
§ Rail rate advanced.

Rail shipments fell off greatly after navigation opened in 1880 and 1882. In 1881 there was some cutting of rates on a scale great enough probably to affect shipments largely, and then a terrible winter had kept the farmers from marketing grain to an extent never known before, so that their shipments were abnormally great when spring opened. Last year there was not much to ship, not nearly so much as this year, and no rates could have given the railroads a good business. This year the shipments did not fall off largely until the lake had been open more than two weeks and the total May shipments will be somewhat larger than in 1880 or 1882.

The lateness of the season keeps every available hand in the corn fields on the farms during May; in the latter half of June the farmers will have more time to market their surplus grain—before that in Kansas, Missouri and that

latitude. If the new crop promises fairly then, they are likely to market their holdings freely. But there is no doubt that May shipments might have been much larger without help from the farmers, the stocks in elevators in Chicago being more than 11,000,000 bushels; and if the shipments should increase it is not certain that the increase or any large part of it would go to the railroads. The vessels can carry vastly more than they are getting.

APRIL EARNINGS are reported in our table by 76 railroads, whose aggregate length this year is 54,776 miles, and 4,622 miles (9.2 per cent.) more than last year. Their aggregate earnings were $29,167,270, which is $1,837,906 (6.7 per cent.) more than last year, and their average earnings per mile *decreased* from $544 to $532, or 2.2 per cent. This is but a small decrease, but it makes quite a contrast with the result in March, when the average earnings per mile of 80 roads were 7.2 per cent. *more* than last year. There are six roads which reported in March that have not reported for April, and two that reported for April but did not report for March. The reduction of the number of companies reporting is generally to be looked upon as a sign of bad business, though of course it is not always so. Two of those that reported for March but not for April—the Chicago, Burlington & Quincy and the Wabash—are among the most important in the country, having together 6,750 miles of road. The failure of the former to report for April, however, was not exceptional. It reports regularly, but usually not in time to be included in our table. It was probably due to the fact that its gross and especially its net earnings were extraordinarily large in March, that they were made known earlier than usual—before the accounts were completely made up, as there has been some small correction of them since. The other companies that reported for March and failed to report for April are the Hocking Valley, the Georgia, the Kansas City, Fort Scott & Gulf, and the Wisconsin Central. Those that reported for April but not for March are the Cincinnati, New Orleans & Texas Pacific and the Kansas City, Lawrence & Southern Kansas, and both of these have given their earnings for the four months, so that March is included.

There are 19 roads out of the 76 whose total earnings in April were less this year than last, and 33 that had smaller earnings per mile. The decreases were generally small, but the Des Moines & Fort Dodge (whose earnings have been remarkably irregular) with an increase of 64 per cent. in mileage has a decrease of 9½ per cent. in earnings, and of 45½ per cent. in earnings per mile; the Marquette, Houghton & Ontonagon lost 53¾ per cent. (due chiefly to later opening of navigation, doubtless); the Iron Mountain, with 23 per cent. more road, had a decrease of 6 per cent. in total earnings and of 23½ per cent. in earnings per mile; and the Ohio Central earned 19½ per cent. less from 22½ per cent. more road—27 per cent. less per mile. There were large gains on some small Southern roads and also on the Milwaukee & St. Paul (22½ per cent. in earnings per mile); the Flint & Pere Marquette (24¼ per cent.), the Hannibal & St. Joseph (22½), the Kansas City, Lawrence & Southern (58¾), the Central Branch, in Northern Kansas (52¾), and the St. Paul & Duluth (21½).

For the four months ending with April we have reports from 78 railroads with 56,784 miles of road this year, and 4,553 miles (8.7 per cent.) more than last year. They earned in the aggregate $119,065,499, and $9,624,353 (8.8 per cent.) more than last year; and their average earnings per mile fell from $2,097 to $2,093—less than one-fifth of 1 per cent.—that is, they were substantially unchanged. For many roads last year was unfavorable, and in view of the much larger crops this year it was to be expected that there would be a considerable improvement in earnings. But though there were light crops to carry last year, business was active, and there was an enormous amount of construction going on, and the railroads as a whole made much better returns than could have been expected from the crop movement. Thus to do no better than last year is after all not doing ill.

RAILROAD EARNINGS, FOUR MONTHS ENDING APRIL 30.

NAME OF ROAD.	MILEAGE. 1883.	1882.	Inc.	Dec	P. c.	EARNINGS. 1883.	1882.	Increase.	Dec.	P.c.	EARNINGS PER MILE. 1883.	1882.	Inc.	Dec.	P.c.
						$	$	$	$		$	$	$	$	
Ala. Gt. Southern	290	290				324,346	253,197	71,149		28.1	1,118	873	245		28.1
Atchison, Top. & S. F.	1,820	1,782	38		2.1	4,343,440	4,500,109		156,665	3.5	2,387	2,523		136	5.4
Bur., Cedar Rap. & No.	714	645	69		10.7	855,586	880,865		25,297	2.9	1,194	1,365		171	12.4
Central, of Georgia	726	712	14		1.9	1,116,300	1,019,616	96,684		9.5	1,534	1,432	102		7.0
Central Iowa	244	244				373,896	361,105	12,791		3.5	1,532	1,480	52		3.5
Central Pacific	2,907	2,917		10	3.4	7,269,635	7,584,568		314,935	3.8	2,501	2,600		99	3.9
Ches. & Ohio	517	435	82		18.9	1,122,871	870,697	252,194		28.8	2,172	2,002	170		8.5
Eliz. Lex. & B. Sandy	130	130				210,716	123,118	87,598		71.2	1,621	947	674		71.2
Chi. & Alton	850	850				2,460,327	2,257,287	263,040		9.0	2,894	2,656	238		9.0
Chi. & Eastern Ill.	245	245				516,555	582,978		16,623	3.1	2,108	2,175		67	3.1
Chi. & Gd. Trunk*	335	335				893,492	675,818	2-3,674		33.0	2,685	2,017	668		33.0
Chi., Mil. & St. Paul	4,523	4,229	294		6.9	6,633,000	5,889,867	743,13		12.6	1,466	1,393	73		5.2
Chi. & Northwestern	3,590	3,198	392		12.2	6,507,209	6,460,783	46,4-6		0.7	1,812	2,020		208	10.3
Chi., St. P., Minn. & O.	1,230	1,009	221		22 0	1,432,328	1,451,688	1,240		0.1	1,141	1,438		297	20.6
Chi. & West Mich.	404	367	37		10.1	469,964	471,314		1,350	0.3	1,175	1,284		111	8.9
Cin., Ind., St. L. & Chi.	384	384				701,275	802,808		41,593	4.2	2,193	2,300		108	5.2
Cin., N. O. & Tex. P.	336	336				736,943	769,449		32,506	4.2	2,193	2,290		97	4.2
Cleve., Akron & Col	144	144				159,035	149,035	10,000		7.1	1,109	1,035	74		7.1
Denver & Rio Grande	1,190	1,062	128		12.1	1,947,000	1,974,000		27,000	1.4	1,636	1,859		223	12.0
Des M. & Ft. Dodge	138	84	54		64.3	93,694	125,888		32,194	25.5	679	1,499		820	54.7
Det., Lan. & No.	226	226				468,967	502,012		33,985	6.7	2,071	2,221		150	6.7
Eastern	284	284				1,053,932	944,882	108,150		11.4	3,708	3,327	381		11.4
East Tenn., Va. & Ga.	1,070	900	170		18.9	1,240,448	958,244	282,204		29.2	1,159	1,065	94		8.8
Evansville & T. H.	146	146				227,050	245,247		18,197	7.4	1,555	1,680		125	7.4
Flint & Pere Marq.	347	345	2		0.6	822,672	716,814	105,858		14.4	2,371	2,078	293		13.8
Florida Transit*	243	187	56		29.9	163,408	147,270	16,198		11.0	673	787		104	13,2
Grand Trunk*	2,321	2,225	96		4.3	5,465,086	4,995,731	469,355		9.4	2,356	2,245	110		4.8
Green Bay, Win. & St. P	220	220				121,996	119,041	2,955		2.5	554	541	13		2.5
Gulf, Col. & S. F.	483	370	113		30.5	559,773	328,475	228,298		69.6	1,153	888	266		29.8
Hannibal & St. Jo.	292	292				797,113	621,773	175,340		28.2	2,730	2,129	601		28.2
Houston, E. & W. Tex.	120	88	32		36.4	98,037	75,922	22,115		29.1	817	863		46	5.3
Ill. Cent., Ill. lines	926	919	7		9.8	2,057,392	2,147,530		110,144	5.3	2,260	2,337		137	5.7
Iowa lines	402	402				606,982	622,723		15,741	2.5	1,508	1,540		41	2.5
Southern Div	578	578				1,426,637	1,120,209	306,428		29.4	2,468	1,930	536		27.4
Ind., Bloom. & West.	695	555	140		25.2	935,786	782,051	153,735		19.6	1,346	1,409		63	4.5
Kan. Cy., L. & So. Kan	399	385	14		3.6	445,801	294,542	151,259		61.4	1,117	765	352		46.0
Lake Erie & Western	386	386				452,592	435,997	16,595		3.9	1,173	1,129	44		3.9
Little Rock & Ft. Smith	168	168				175,742	136,557	39,185		28.6	1,046	813	233		28.6
Little R's, Miss. R. & Tex	173	156	17		10.9	128,869	78,594	50,278		63.6	745	504	241		48.0
Long Island	354	335	19		5.8	591,519	541,137	50,382		9.3	1,671	1,630	41		2.5
Louisville & Nashv.	2,026	2,028		2	0.1	4,216,068	3,947,279	268,729		6.5	2,08.	1,946	135		6.9
Mar., Hought. & Ont.	97	88	9		10.2	73,479	106,052		32,573	30.7	756	1,205		449	37.4
Memphis & Charleston	292	292				398,582	352,882	45,700		12.9	1,365	1,209	156		12.9
Mil., Lake Sh. & West.	315	275	40		14.5	293,245	274,037	19,208		7.0	931	996		65	6.6
Mo. Pacific lines:															
Central Branch	388	388				452,360	268,888	183,272		68.2	1,166	693	473		68.2
Int. & Gt. No.	788	775	13		1.7	1,236,107	967,063	263,044		27.2	1,561	1,248	313		25.0
Mo., Kan. & Tex.	1,374	1,207	167		13.9	2,183,416	1,711,088	472,327		27.6	1,589	1,418	171		12.2
Mo. Pacific	990	785	205		26.2	2,816,634	2,113,984	697,650		32.9	2,845	2,699	146		5.4
St. L., Iron Mt. & So.	882	719	163		23.2	2,365,053	2,182,483	182,570		8.4	2,682	3,035		353	11.6
Texas & Pacific	1,487	1,234	253		20.5	1,883,350	1,314,716	568,934		43.3	1,267	1,065	20		18.9
Mobile & Ohio	528	528				696,746	608,388	88,358		14.0	1,320	1,152	168		14.5
Nash., Chatta. & St. L.	539	526	13		2.4	700,249	690,456	69,793		10.1	1,411	1,312	99		7.6
N. Y. & New England	399	396	3		0.7	1,043,728	957,569	86,356		9.0	2,616	2,418	198		8.2
N. Y., Su-q. & West	147	86	61		70.9	291,778	189,149	102,629		54.3	1,985	2,199		214	9.7
Norfolk & Western	428	428				800,162	664,793	135,369		20.4	1,851	1,534	317		20.4
Northern Central	322	322				1,963,318	1,656,198	313,120		18.5	6,116	5,145	973		18.9
Northern Pacific	1,023	972	651		66.9	1,945,743	1,338,408	607,275		45.4	1,199	1,377		278	19.8
Ohio Central	258	232	26		11.2	293,820	292,285	1,545		0.5	1,139	1,260		121	9.6
Ohio Southern	138	128	10		7.8	134,270	113,381	20,888		18.5	973	886	87		9.8
Pennsylvania†	2,048	1,954	94		4.7	15,892,707	14,448,219	1,444,488		10.0	7,760	7,394	366		5.0
Peoria, Dec. & Evans.	254	254				213,525	253,514		39,989	15.7	841	998		157	15.7
Phila. & Reading	999	994	5		0.5	6,458,453	6,113,297	345,196		5.7	6,465	6,150	315		5.1
Rich. & Danville lines:															
Char., Col. & Aug.	238	238				301,724	252,552	49,172		19.4	1,282	1,061	211		19.4
Col. & Greenville	296	296				297,805	263,180	34,625		13.2	1,006	889	117		13.2
Rich. & Danville	773	766	7		0.9	1,208,828	1,181,256	27,572		2.3	1,564	1,542	22		1.4
Va. Midland	352	352				460,178	393,511	66,667		16.9	1,307	1,118	189		16.9
Western N. C.	190	165	25		15.2	95,580	61,732	33,848		55.5	505	374	129		34.8
St. L., Alt. & T. Haute:															
Main Line	195	195				467,994	409,093	58,901		14 4	2,400	2,098	302		14 9
Belleville Line	121	121				286,904	266,340	2,564		0.9	2,222	2,201	21		0.4
St. L. & Cairo	146	146				110,857	115,356		4,499	3.9	760	790		30	3.9
St. L. & San Francisco.	725	660	65		9.8	1,140,209	1,019,204	121,005		11.8	1,575	1,543	30		1 9
St. P. & Duluth	196	196				297,975	247,317	50,658		20.5	1,570	1,262	258		20.5
St. P., Minn. & Manitoba	1,288	912	367		41.7	2,421,196	1,915,713	505,483		26.4	1,880	1,101		221	10.5
Scioto Valley	128	128				152,599	154,621		2,022	1.3	1,192	1,208		16	1.3
South Carolina	243	243				494,925	443,499	51,426		11.6	2,037	1,825	212		11.6
Union Pacific	4,693	4,327	366		8.5	8,418,378	8,776,237		357,859	4.1	1,794	2,028		234	11.5
Vicksburg & Meridian	142	142				169,410	157,212	12,198		7.8	1,193	1,107	86		7.8
West Jersey	186	168	18		10.7	276,746	246,829	29,917		12.1	1,488	1,469	19		1.3
Total, 78 roads	56,784	52,231	4,565	12		119,065,499	109,441,146	10,887,624	1,263,271		2,093	2,097		4	
Total inc. or dec.			4,553		8.7			9,624,353		8.8					0.2

SUPPLEMENTARY TABLE.

Oregon Ry. & Nav. Co‡	2,150	1,960	190		9.7	1,454,600	1,482,491		27,891	1.9	676	756		80	10.7
Phila. & Read. Coal & Iron Co.						4,228,083	3,794,600	433,483		11.4					

* Not in table of earnings for April.
† Includes all lines east of Pittsburgh and Erie.
‡ Railroad, 575 miles; river and ocean lines, 1,575 miles.

CANAL RATES have risen this week from 4 cents a bushel for corn and 4½ for wheat from Buffalo to New York to 4½ and 5. A year ago at this time they were 3¾ and 4¼, and two years ago 4½ and 5. Thus the boatman and not the shipper is now getting the whole benefit of the abolition of tolls—1 cent a bushel—and the railroads find no greater competition from the canal than before. Lake rates remain unchanged at 2 cents a bushel for corn and 2¼ for wheat from Chicago to Buffalo. This is the same as at this time last year, but two years ago the rates were twice as high.

Ocean rates have changed very little during the past week. Tuesday grain was taken by steam for Liverpool at 3⅝d. per bushel. Last year about this time some cargoes were taken without charge, and not more than 1d. a bushel was paid until about the middle of June. Exports were but trifling, and a great many steamers were arriving with immigrants and merchandise. Two years ago the ocean rate was about 3d.

Taking all the charges together except the New York transfer, the cost of shipping a bushel of wheat from Chicago to Liverpool is about 15 cents now, against 9¼ last year and 16¼ in 1881. All these are low rates; the ocean rate alone has often been more than the whole of it. Of the increase of 5¾ cents over last year, ¾ cent is in the canal and 5 cents in the ocean rate.

CANAL GRAIN SHIPMENTS should now be feeling the stimulus produced by the abolition of tolls. The railroads are charging the same as last year, so that the boats get the whole benefit of the toll, which was very nearly a cent a bushel.

Now during the first two weeks that the canal was open, ending May 19, the shipments from Buffalo were:

	1883.	1882.	Increase.	P. c.
By canal	3,301,397	2,079,934	1,229,463	59.4
By rail	1,623,650	745,496	878,154	118.0

The canal gained, truly, but in proportion only about half as much as the railroads. Last year the canal carried 74 per cent. of the whole; this year, 67 per cent.

National Exposition of Railway Appliances.

The National Exposition of Railway Appliances was formally opened to the public on the evening of May 24. The proceedings opened with prayer by the Rev. Dr. Swing. An address of welcome to the visitors was made by Mayor Harrison. This was followed by a short speech by Vice-President French, who referred to the labors of his fellow members on the Commission.

The address of the evening was then made by Hon. E. B. Washburne, who spoke as follows:

The National Exposition of Railway Appliances is now to be declared open in these colossal structures and in this magnificent presence. The conception of this great enterprise was less than one year ago, and it has been carried forward with an energy, a zeal and a devotion only equaled by the success attending it. The subject had only to be suggested to challenge the widest interest in many countries and among all classes connected with railway and manufacturing interests.

The purpose of the Exposition, looking to the improvement in railway appliances and the advancement in railway knowledge, coupled with its benevolent objects, must commend itself to all devotees of progress and all lovers of science and invention.

When we look around and about us and behold this marvelous and wonderful display, we are lost in admiration at the strength of the human understanding and the inventive genius of man.

In the presence of all these wonderful and varied inventions, fashioned into shape by the cunning hand of the artisan, revealing novelties and improvements unknown in bygone ages, and of the extent of which the wildest imagination never dreamed, we bow in admiration to the genius of the age.

Uniting intelligence to science and virtue, there seems to be no limit to the advancement of the human race.

This is not the occasion to dwell in detail on railroad statistics. But I can speak a word on railroads generally. They have changed the face not only of the civilized but the savage world. In this country mighty rivers have been spanned, forests cut through, and mountains hewn down. Empires have been opened up to the advancing wave of civilization, and the desert has been made to bloom and blossom like the rose. Traversed by railroads, the older organized communities have not only received their benefits, but in almost unknown regions new territories and states have been organized, and towns and cities have sprung up as if by magic. The Atlantic coast has kissed the golden shores of the Pacific sea, and nature has everywhere been subordinated to the uses and purposes of man.

The extent of this exposition is simply bewildering. More than 1,000 firms, companies and individuals are represented in these vast inclosures, covering an area of eleven acres. We may turn and turn like the sunflower, and we are confronted on all sides by every possible combination of mechanical genius as connected with railroading in all its departments, forms and ramifications, from its earliest history to the present time. In the department called the "Old Curiosity Shop" the whole history of railway appliances and railroad progress is traced and illustrated.

The people of other countries have honored this exposition

by the interest they have taken in it. The gracious courtesy of the Directors of the South Kensington Museum, London, in sending to the exposition what is claimed to be the first locomotive that ever turned a wheel, invented and constructed by a man whose name shall never die—George Stephenson—will be gratefully recognized by all who will have the pleasure of looking at it. With what intense interest we gaze on that original locomotive, the "Rocket." It proved to be a machine which did not go up like a rocket to come down like a stick, but it went up to stay up and to revolutionize all ideas of locomotion. Added to this is the boiler for one of the first engines ever used in this country, called the "Stourbridge Lion"—probably named from the roar the steam emitted. There is also on exhibition, the first locomotive ever brought to America—to Nova Scotia—appropriately named the "America;" and we greet on the platform the engineer who has run it ever since, who nursed it in its cradle, stood by it in its meridian life, and is now tenderly caring for it in its declining years. There will be found further in the "Old Curiosity Shop," many old stagers, and among them the "John Bull," the "Puffing Billy," English built, and the "Arabian," built by the Baltimore & Ohio Railroad in 1834. To show the vast strides made in constructing locomotives, from the pigmies to the giants, we are invited to look at the great monster—the largest locomotive in the world—the Mastodon, with the enormous weight of more than ninety tons.

And here, too, we are interested in the "Grasshopper," the first locomotive which ever ran on the Baltimore & Ohio Railroad. The name does not indicate that high rate of speed which compelled the railroads of a later day to put up that huge sign at the crossings, "Look out for the engine while the bell rings."

All Illinoisans will inspect with curiosity the first locomotive that ever ran on the pioneer railroad of this state—the Galena & Chicago Union railroad—a name that should never have been changed. This locomotive was fired up and run out on the road five miles Oct. 25, 1848. Perhaps I might be pardoned in alluding for a moment to the railroads in Illinois. When I first set foot on her generous soil, in March, 1840, only a few miles of what was then called a railroad, the Northern Cross Railroad, had been built—a road which was to be extended from Meredosia, on the Illinois River, to Springfield. Eight miles of track was laid in 1838, and it was on the 8th of November, 1838, that the first locomotive was ever put in operation in the state. The road did not pay expenses. The steam-power was reduced to mule-power, and it was a witty saying at the time that when more speed was demanded they took off the mules and put on oxen. The road was eventually abandoned. The building of the Galena & Chicago Railroad was commenced March 1, 1848, and carried forward to completion to Freeport, September 1, 1853. That road was therefore justly entitled to be called the pioneer railroad of Illinois. I have probably ridden many times behind the locomotive here exhibited, but the first time I ever passed over that road was in the summer of 1849 in a hand-car from Cottage Grove, the then terminus, to Chicago. The change in the state since that time is something unparalleled in the world's history. From five miles of track in October, 1848, Illinois has become the banner railroad state in the Union, with its 9,000 miles in operation and 2,000 more than any other state, while Chicago has become the greatest railroad centre in the world, with its twenty-three great lines centering here and radiating to every part of the country.

We rejoice in the presence of so many of our Canadian friends and neighbors, and we thank them for all the interest they manifest in this exposition. Canada and Illinois are allied by the early ties of a common history. For a century prior to 1763, when the sceptre of France passed to Great Britain, the flag of the Bourbons floated alike over Canada and Illinois, those vast countries which comprised that Nouvelle France, the most gorgeous jewel which ever glittered in the diadems of the French Kings. All Illinoisans remembered with pride and gratitude that Canada gave to our state its first Lieutenant-Governor, Pierre Menard, a native of Quebec, a man whose long life was without a stain. His devotion to the interest of our new state, his enterprise, and his intelligence, his probity of character, his liberality, and his benevolence, will make the name and memory of this noble son of Canada to be revered and cherished by the people of Illinois so long as the state shall have a history.

There have been expositions in many countries, and nations have vied with each other in the display of all that ingenuity and taste could suggest or wealth procure, but it is safe to say that the world has never seen a more creditable exposition than this, organized solely by private enterprise, and pushed to what we see before us by private citizens with a degree of unselfishness and devotion rarely witnessed, and without pecuniary compensation. But they will find their reward in the gratitude of that public which will appreciate all their labors and responsibilities, and all the great services they have rendered to science and to mankind.

Blessed by a benign Providence, we have a country in respect of all the elements which go to make up a grand and mighty nation that has no parallel on the face of the globe. Let this great heritage that has come down to us be cherished by every consideration which should influence a people to uphold in all their force the principles of a republican government and that public and private virtue without which no nation can live. Influenced by patriotism, guided by enlightened statesmanship, and illustrated by unsullied integrity, we will, by the blessing of God, continue to march forward in the pathway of progress to become the pride, the glory, the emulation of the civilized world.

But I must close, for I know with what impatience you are all waiting the official announcement of the opening of an exposition which will so interest and instruct you all, and which must redound to the advantage of science and the public good, an honor to the city of Chicago and the state of Illinois, and a benefit to our country and the world at large.

Mr. French then introduced some of the veterans present, including the old engineers Wm. Galloway, George Hollingsworth, David Matthew and Joseph Whitehead, and Mr. Horatio Allen. Mr. Allen made a short address. The proceedings then closed with music.

So far a very large attendance is reported at the Exposition, so large, indeed, as to exceed the expectations of the managers.

THE SCRAP HEAP.

The Rail Market.

Steel Rails.—More inquiry is reported and several orders for 10,000 tons or over are said to be on the market. Quotations are unchanged at $38 to $39 per ton at mill for heavy sections, and $39 50 to $42 for light rails.

Rail Fastenings.—Spikes have advanced again and are quoted at $2 60 per 100 lbs. Track bolts are steady at $3.25 to $3 40. Splice-bars are steady at 2 to 2.10 cents per pound.

Old Rails.—Old iron rails are weak and Philadelphia quotations are $23.50 to $24 for spot lots, but not over $21.50 to $22 per ton is offered for July delivery.

Two Veterans.

The Chicago *Inter-Ocean* says: "A noteworthy incident that occurred last evening was the meeting of two old engineers, one aged 84 years, who entered the railway service as engineer in 1828, and the other, who began in 1829. They had not met each other for forty years, and naturally began to talk over old times. They boasted over their past labors, and in a quarter of an hour were in the midst of a heated discussion regarding railway inventions, each claiming the credit for almost everything that was invented since they began railroading. Spectators say that the scene was remarkably interesting as well as ludicrous, and declared that each man appeared to be in earnest in demanding credit for all modern railway inventions."

Fast Time.

On May 29 an express train on the New York, New Haven & Hartford road made the run from the Grand Central depot in New York to New Haven, 73¼ miles, in 1 hour and 38 minutes, making four stops at draw-bridges. This is said to be the fastest time ever made between New York and New Haven. Making no allowance for stops, the trip was made at the rate of 44.7 miles an hour.

A Generous Act.

The Pennsylvania Railroad Co., it is said, has ordered that the men thrown out of employment by the destruction of the shops at the Hackensack Meadows be retained on the pay-roll at full wages until the structure is rebuilt. They will also pay to every man the loss he sustained by the destruction of his tools.

An Esthetic Station.

The picture published by us in a recent number has already produced results. The Boston *Herald* says that the Boston & Maine is building an esthetic depot at Kennebunk Beach, Me., that may safely be described as "too utterly utter."

A Model Exhibitor.

One of the exhibitors at the Railway Exposition is remarkable for two things. He has been at the building for several weeks talking about his exhibit, but no one has seen it yet. He devotes one-tenth of his time to talking about his invention, and the other nine-tenths to changing his clothes. When he comes to the building early in the morning he always wears his 9-o'clock pants and carries his after-breakfast cane. He then goes to the hotel and puts on a suit lighter in color, and gets his dinner and another cane. Thus far his clothes are superior to his exhibit.—*Chicago Inter-Ocean.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Central Iowa, annual meeting, at the office in Marshalltown, Ia., June 6.

Chicago, Milwaukee & St. Paul, annual meeting, at the office in Milwaukee, June 4.

Chicago, Rock Island & Pacific, annual meeting, at the office in Chicago, June 6.

Rome, Watertown & Ogdensburg, annual meeting, at the office in Watertown, N. Y., June 6.

Dividends.

Dividends have been declared as follows:

Boston & Albany, 2 per cent., quarterly, payable June 30 to stockholders of record on May 31.

Lowell & Framingham (leased to Old Colony), 1¼ per cent., semi-annual, on the preferred stock, payable June 1

Eastern in New Hampshire (leased to Eastern), 2¼ per cent., semi-annual, payable June 15.

Northern (New Hampshire), 3 per cent., semi-annual, payable June 1.

Railroad and Technical Conventions.

The *Master Car-Builders' Association* will hold its annual convention in Chicago, beginning June 12 next. The meeting will be held in the Grand Pacific Hotel. The charge at the hotel to members will be $3 per day for ordinary rooms.

The *American Society of Mechanical Engineers* will hold its summer meeting in Cleveland, O., beginning Tuesday, June 12.

The *Association of Railroad Telegraph Superintendents* will hold its annual meeting at the Grand Pacific Hotel in Chicago, beginning on Wednesday, June 13. The Executive Committee has decided to change the date to June 13, from May 16, the date originally fixed, in order that members may have an opportunity of visiting the Exhibition of Railroad Appliances.

The *Yard-Masters' Mutual Benefit Association* will hold its annual meeting in Denver, Col., June 13.

The *Master Mechanics' Association* will hold its annual convention in Chicago, June 19 next. Accommodations have been secured for members at the Grand Pacific Hotel at specified rates, which will be made known, and rooms reserved, on application to the Secretary or to Mr. E. T. Jeffrey, Chairman of the Committee of Arrangements.

The *American Society of Civil Engineers* will hold its annual convention this year at St. Paul and Minneapolis, Minn., beginning June 19.

The *American Institute of Mining Engineers* will hold its next meeting at Roanoke, Virginia, beginning on Monday, June 4.

The *General Baggage Agents' Association* will hold its next semi-annual meeting at the Tremont House, Chicago, Aug. 8.

The *New England Road-Masters' Association* will hold its first annual meeting in Boston, Sept. 20. Further particulars will be given hereafter.

Foreclosure Sales.

The *Massachusetts Central* road will be sold at public sale in Hudson, Mass., Sept. 1 next, by the trustees under the first mortgage, under authority of an order of the Supreme Court. The sale will include the finished line of 43 miles from the junction with the Boston & Lowell near Cambridge to Jefferson, the partly graded line from Jefferson to Northampton, 58 miles, and all other property of the company. Conditions will be made known at the time of sale.

American Association of Railroad Superintendents.

The semi-annual convention of this Association began at the Grand Pacific Hotel in Chicago, May 29, with a full attendance. The first day was chiefly devoted to the discussion of the question of standard time, and it was finally resolved to approve the system devised by Mr. W. F. Allen, of the *Official Guide*, and approved at the late meetings of the General Time Convention and the Southern Time Convention.

It was resolved to hold the fall meeting in Washington, Oct. 23.

ELECTIONS AND APPOINTMENTS.

Atchison Topeka & Santa Fe.—Mr. A. A. Robinson, the new Assistant General Superintendent, has issued an order stating that on and after June 1, the Atchison line will be divided, for operating purposes, into the Eastern, Middle, Western and Southern divisions. On the Eastern Division the organization will remain as at present, except as hereinafter stated; on the other divisions all the employés will be under the control of and follow instructions from their superintendent. Mr. D. J. Chase, as Superintendent, will have charge of the Eastern Division. Mr. H. R. Nickerson, as Superintendent, will have charge of the Middle Division. Mr. W. W. Borst, as Superintendent, will have charge of the Western Division. Mr. George L. Sands, as Superintendent, will have charge of the Southern Division.

Baltimore & Hanover.—At the annual meeting, May 28, the following were chosen: President, A. W. Eichelberger; Directors, Wm. E. Hoffman, L. F. Melsheimer, Stephen Keefer, Charles W. Slagle, Wm. H. Vickery, C. C. Wooden. The road is leased to the Hanover Junction, Hanover and Gettysburg.

Boston, Concord & Montreal.—At the annual meeting in Plymouth, N. H., May 28, the following directors were chosen: Joseph A. Dodge, Nathan Weeks, Plymouth, N. H.; Warren F. Daniell, Franklin, N. H.; Samuel N. Bell, Manchester, N. H.; Peter Butler, John P. Spaulding, J. Thomas Vose, Boston. The board re-elected J. Thomas Vose President; Samuel N. Bell, Clerk.

Cambridge & Seaford.—The officers of this company, successor to the Dorchester & Delaware, are: President, Isaac Hinckley; Secretary and Treasurer, Robert Craven.

Chesapeake, Ohio & Southwestern.—Mr. G. A Haggerty has been appointed Superintendent of Motive Power and Machinery of the whole line, with office at Elizabethtown, Ky. He was recently Master Mechanic of the East Broad Top road, and before that Superintendent of the Galena & Wisconsin road.

Chicago & Alton.—Mr. J. C. McMullin, for some time past General Manager, has been chosen Vice-President, a new office on this road. Mr. C. H. Chappell, Assistant, and for a year past Acting General Manager, succeeds Mr. McMullin as General Manager of the road.

Concord.—At the annual meeting in Concord, May 29, the following directors were chosen: Benjamin A. Kimball, Henry C. Sherburne, Concord, N. H.; James W. Johnson, Enfield, N. H.; Samuel N. Bell, Frederick A. Smythe, Manchester, N. H.; F. B. Hayes, J. Thomas Vose, Boston.

Kanawha Dispatch.—Mr. Edward Fitzgerald has been appointed Manager of this new fast freight line.

Long Island.—The board has re-elected Austin Corbin President; J. Rogers Maxwell, Vice-President; E. B. Hinsdale, Secretary: Henry Graves, Treasurer.

Louisville, Evansville & St. Louis.—Mr. Charles B. Kinnan has been appointed General Western Passenger Agent, with headquarters in St. Louis. He will also represent in St. Louis the well known firm of Leve & Alden, tourist agents. Mr. Kinnan was recently with the Missouri Pacific road.

Louisville, New Albany & Chicago.—The following appointments, which have been heretofore referred to, are officially announced to take effect June 1: General Superintendent John McLeod having resigned (to take charge of the Indianapolis Belt road), the office is abolished. Mr. N. W. Marshall, late Assistant to Mr. McLeod, is appointed Superintendent of the Main Line Division, with office in Louisville, Ky. Mr. W. G. Taylor is appointed Superintendent of the Chicago & Indianapolis Division, with office in Chicago. Mr. D. J. Finley, late Chief Train Dispatcher, succeeds Mr. Taylor as Master of Transportation, with office at LaFayette, Indiana.

Manchester & Lawrence.—At the annual meeting in Manchester last week the following directors were chosen: Benjamin F. Martin, Nathan Parker, Manchester, N. H.; Edward A. Abbott, Asa Fowler, John A. White, Concord, N. H.; Joseph W. Smith, Andover, Mass.; Wm. A. Tower, Boston. The board elected Benjamin F. Martin President; Samuel N. Bell, Clerk.

Meredith & Conway.—At the annual meeting in Plymouth, N. H., May 28, the following were chosen: President, J. Wentworth; Directors, Samuel N. Bell, B. H. Corning, Joseph A. Dodge, J. A. French; Clerk, B. H. Corning.

Middletown, Unionville & Water Gap.—At the annual meeting in Middletown, N. Y., May 28, the following directors were chosen: Grinnell Burt, Caleb Clark, W. H. Clark, George L. Denton, D. C. Dusenberry, H. S. Hayne, James N. Pronk, A. H. Russell, John N. Smith, M. D. Stivers, H. A. Wadsworth, H. R. Wilcox, W. H. Wood. The road is leased to the New York, Susquehanna & Western.

Missouri Central.—The directors of this new company are: W. B. Steele, Robert Taubman, Robert Taylor, Lexington, Mo.; John E. Corder, Nathan Corder, W. A. Redd, Waverley, Mo.; Wm. Baker, A. F. Brown, B. Thomas, S. T. Wilson, Malta Bend, Mo.; J. B. Breathitt, J. W. Cordell, T. C. Rainey, Marshall, Mo.

Missouri Pacific.—Mr. Charles W. Hammond, for two years past Superintendent of Telegraph Lines on the Iron Mountain, International & Great Northern and Texas & Pacific roads, has had his jurisdiction extended so as to embrace the entire Missouri Pacific system. Mr. Hammond is one of the oldest telegraphers in the country, and is well known throughout the West.

Nashua & Lowell.—At the annual meeting in Nashua, N. H., May 30, the following were chosen: Directors, W. H. Bailey, Francis A. Brooks, C. V. Dearborn, Francis E. Parker, Sidney D. Richardson, H. M Shaw, J. W. Vhite; Clerk, W. A. Lovering; Treasurer, Charles B. Brooks. The road is leased to the Boston & Lowell.

Nashua & Rochester.—At the annual meeting in Nashua, N. H., last week, the following were chosen: President, Francis H. Kinnicutt: Directors, Joseph C. Barley, Francis H. Dewey, A. H. Dunlap, J. C. Eastman, A. M. Norton, A. J. Pillsbury, E. B. Stoddart, Aaron F. Stevens, Charles S. Turner, Edwin Wallace; Clerk, Aaron F. Stevens. The road is leased to the Worcester & Nashua.

New York & North Pennsylvania.—This company has been organized with the following officers: President, Charles L. Partison; Vice-President, R. G. Taylor, Bradford, Pa.; Secretary, S. H. Morgan, Addison, N. Y.; Treasurer, W. C. Sheldon, New York; Chief Engineer, N. S. Beardsley.

New York, Lake Erie & Western.—Mr. Samuel H. Wenck is appointed Assistant Auditor of Freight Receipts of this company, to take effect from May 23.

New York Railroad Commission.—A Rochester dispatch says that Mr. T. W. Spencer has been appointed Engineer to the Commission. He is now Engineer in charge of the Rochester Division of the New York, West Shore & Buffalo road.

New Zealand River.—At the annual meeting in Plymouth N. H., May 28, the following directors were chosen: S. N. Bell, B. H. Corning, J. A. Dodge, J. P. Pitman, Henry Tilton, J. Thomas Vose.

Pacific Mail Steamship Co.—At the annual meeting in New York, May 30, the following directors were chosen: Sidney Dillon, Jay Gould, Henry Hart, J. B. Houston, C. P. Huntington, Edward Lauterbach, E. H. Perkins, Jr., Wm. Remsen, Russell Sage.

Pemigewasset Valley.—At the annual meeting in Plymouth, N. H., May 28, the following were chosen: President, J. Thomas Vose; Directors, Daniel Barnard, Samuel N. Bell, Peter Butler, J. W. Campbell, Joseph A. Dodge, Warren F. Daniell, Daniel Saunders, Nathan Weeks. The road is leased to the Boston, Concord & Montreal.

South Florida.—Mr. C. D. Owens is appointed General Agent, with office at No. 271 Broadway, New York. Mr. Owens is also General Agent of the Savannah, Florida & Western.

West Jersey.—Under the revised organization of this company the following appointments have been made: General Solicitor, John Scott; Assistant General Solicitor, J. A. Logan; General Superintendent of Motive Power, T. N. Ely; General Freight Agent, John S. Wilson; Assistant General Freight Agent, Walter Freeman; Division Freight Agent, E. W. Coffin; Assistant General Passenger Agent, George W. Boyd; Division Ticket Agent, J. S. Hackett; Assistant Purchasing Agent, Thomas P. Sargent.

Whitefield & Jefferson.—At the annual meeting in Plymouth, N. H., May 28, the following directors were chosen: Samuel N. Bell, A. L. Brown, W. G. Brown, W. F. Daniell, J. A. Dodge, Thomas Grey, N. R. Perkins, J. Thos. Vose.

Wilton.—At the annual meeting in Nashua, N. H., May 30, the following were chosen: Directors, Clark C. Boutwell Wm. Ramsdell, John Reed, John A. Spalding, Solomon Spalding; Clerk, H. A. Whiting; treasurer, Frank A. Mc Keen. The road is leased to the Boston & Lowell.

PERSONAL.

—Mr. David B. Hammond, formerly a well-known citizen of Chicago, died May 26, at his farm near Elgin, Ill., to which he removed some 17 years ago. Mr. Hammond was a member of the first board of Railroad and Warehouse Commissioners of Illinois.

—It is again reported that Mr. Franklin B. Gowen intends to resign the presidency of the Philadelphia & Reading Co., and a memorial requesting him to retain that office has been circulating among the stockholders in Philadelphia. It is said to have received many signatures.

—Mr. Edward M. Clymer, President of the New York, Lake Erie & Western Coal & Railroad Co., the company which owns the Erie coal lands in Pennsylvania and the branch which leads to them, died in New York, May 25. His home was in Reading, Pa., and he was 60 years old.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Four months ending April 30:				
Norfolk & Western	$800,162	$664,793	I. $135,369	20.4
Net earnings	338,094	254,049	I. 84,045	33.1
Northern Central	1,969,318	1,657,198	I. 313,120	18.9
Net earnings	687,234	484,990	I. 202,244	41.7
Oregon & California	277,359	.....	.....	.....
West Jersey	276,746	246,829	I. 29,917	12.1
Net earnings	90,277	101,736	D. 11,459	11.2
Month of April:				
Norfolk & Western	$190,906	$171,793	I. $19,213	11.2
Net earnings	81,227	66,813	I. 14,414	21.5
Northern Central	476,335	420,490	I. 55,845	13.6
Net earnings	194,794	153,110	I. 41,684	27.2
Oregon & California	67,069	.....	.....	.....
Vicksburg, Shreveport & P.	2,754	605	I. 2,249	371.7
West Jersey	76,022	70,363	I. 5,659	8.4
Net earnings	19,030	27,272	D. 8,242	30.5
Second week in May:				
Chi. & Grand Trunk	$61,264	$35,050	I. $26,214	74.9
Detroit, Lansing & No.	27,481	25,537	I. 1,944	7.5
Ft. Worth & Denver	10,300	.....	.....	.....
Peoria, Dec. & Evansville	13,504	11,993	I. 1,511	12.6
Third week in May:				
Bur., Cedar Rap. & No.	$41,612	$45,111	D. $3,499	7.8
Chi. & Alton	161,113	143,081	I. 18,032	12.6
Chi. & Eastern Illinois	36,272	38,819	D. 2,547	6.5
Chi. & Grand Trunk	50,971	37,117	I. 13,854	37.4
Chi., Milwaukee & St. P.	428,000	389,554	I. 61,446	16.7
Chicago & Northwestern	456,400	421,900	I. 24,500	8.2
Chi., St. P., Minn & O.	98,200	89,900	I. 8,300	9.2
Cin., Ind., St. L. & Chi.	45,268	43,692	I. 1,606	3.6
Denver & Rio Grande	133,700	132,500	I. 1,200	0.9
Hannibal & St. Jo.	48,600	37,500	I. 11,100	29.6
Louisville & Nashville	237,975	216,075	I. 21,900	10.1
Mo. Pacific lines	627,318	527,702	I. 99,616	18.9
Northern Pacific	166,600	139,150	I. 27,450	19.7
St. L. & San Francisco	52,000	51,251	I. 10,749	21.1
St. P., Minn. & Manitoba	147,000	196,804	D. 49,804	25.3
Wabash, St. L. & Pac.	264,489	266,228	D. 1,739	0.7

Tobacco Rates.

Commissioner Fink announces that at a meeting of the Joint Executive Committee, held in New York May 16, 1883, it was decided to discontinue the practice of quoting through rates on unmanufactured tobacco from river landings and interior points South to Eastern cities, and in lieu thereof to charge on and after Monday, May 28, 1883, the following fixed rates (in cents per 100 lbs.) from the points named below on all the shipments of tobacco, whether originating at those points or passing through them from points beyond:

To New York from—	All rail.	—Chesapeake & Ohio.— Not insured.	Insured.
East St. Louis, East Hannibal, Quincy, East Louisiana East Keokuk, East Burlington and Rock Island	43	39	41
Cincinnati	32	28	30
Louisville	36	32	34
Jeffersonville and New Albany	35	31	33
Evansville and Rockport	40	36	....
Cairo	43	39	....
Chicago	37½	..	....
Indianapolis	34	....	....

Chesapeake & Ohio shipments go by water from Newport News to New York.

Coal.

Coal tonnages for the week ending May 19 are reported as follows:

	1883.	1882.	Inc. or Dec.	P.c
Anthracite	764,940	691,637	I. 73,303	10.6
Semi-bituminous	120,313	85,898	I. 34,415	40.0
Bituminous, Penna	46,525	65,464	D. 18,939	28.8
Coke, Penna	60,271	54,249	I. 6,022	11.1

The anthracite market is quet, and prices are said to be considerably below the company's lists. The production reported for the week is extraordinarily large, as is generally the case in the full-time weeks when a period of short time in alternate weeks has been agreed upon.

The coal tonnage of the Pennsylvania Railroad for the week ending May 19 was:

	Coal.	Coke.	Total.
From line of road	114,356	49,786	164,142
From other roads	36,804	10,485	47,289
Total	151,160	60,271	211,431

The total tonnage this year to May 19 was 4,529,234 tons, against 4,246,842 tons to the corresponding time in 1882, an increase of 282,392 tons, or 6.6 per cent.

Cumberland coal shipments for the week ending May 26 were 52,582 tons. The total shipments this year to May 26 were 837,424 tons.

Petroleum.

The production of the Pennsylvania and New York oil regions for April is given as follows by Stowell's *Petroleum Reporter*, in barrels of 42 gallons:

	1883.	1882.	Inc. or Dec.	P. c.
Production	1,816,530	2,402,790	D. 586,260	24.4
Shipments	1,908,379	1,678,134	I. 230,245	13.7
Stock, April 30	35,789,406	28,547,481	I. 7,241,925	25.4
Producing wells	17,100	19,150	D. 2,050	10.7

The production was greater than in March, but was exceeded in every other preceding month since January, 1880. Of the total production the Allegbany District furnished 19.7 per cent.; the Bradford District, 58.0 per cent.; the Middle Districts in Pennsylvania, 12.4 per cent., and the Southern districts, 9.9 per cent. The comparatively new Northern district s thus furnished 77.7 per cent. of the total.

Shipments are the largest reported since October, and were exceeded only in five months of last year and five months of 1881. For the first time in many months the shipments exceeded the production.

The stock reported is all in the pipe lines; it was reduced 91,849 barrels during the month.

There were 209 wells completed during the month and 21 dry holes or drills given up. There were 199 new wells in progress April 30.

Shipments out of the regions during the month were as follows:

	Barrels.	Per cent. of total.
New York	874,019	45.8
Philadelphia	113,121	5.9
Baltimore	61,448	3.3
Cleveland	467,863	24.5
Pittsburgh	53,690	2.8
Down the Ohio	1,684	0.1
Local points	237,474	12.4
Refined at Creek refineries	99,080	5.2
Total	1,908,379	100.0

Of the total shipments from the wells 348,846 barrels, or 18.3 per cent., are reported by rail, and 1,559,533 barrels, or 81.7 per cent., by pipe line.

Shipments of oil refined at Creek refineries (reduced to its equivalent in crude) were: New York, 65,702; Philadelphia, 90; Baltimore, 451; Boston, 720; local points, 32,117; total, 99,080 barrels.

The *Reporter* says: "During the past six months there have been developed, among other things, these six significant facts:

"1. A larger per centum of dry holes than we have had in any month for seven years.

"2. A less number of drilling wells than for any corresponding month since 1875.

"3. A less number of new wells completed than for any corresponding month in any year since 1876.

"4. A less daily production than in any corresponding month since 1879.

"5. A larger shipment from the producing region for the month than for any corresponding month since the petroleum trade began.

"6. The first month since October, 1878, in which the stock of petroleum in the region has been reduced."

Grain Movement.

For the week ending May 19, receipts and shipments of grain of all kinds at the eight reporting Northwestern markets, and receipts at the seven Atlantic ports have been, in bushels, for the past seven years.

Year.	Northwestern receipts.	—Northwestern shipments.— Total.	By rail.	P. c. by rail.	Atlantic receipts.
1877	2,294,405	2,330,304	794,342	34.1	3,506,821
1878	5,929,890	4,907,025	1,957,051	39.9	6,117,072
1879	3,713,978	4,802,116	2,470,084	41.5	5,977,584
1880	6,220,796	5,231,104	1,437,857	27.8	4,960,665
1881	4,751,613	6,228,275	1,755,217	28.2	7,087,741
1882	2,607,230	1,636,435	979,924	59.9	2,124,192
1883	3,209,064	4,218,677	1,441,099	34.1	4,193,046

Thus the receipts of the Northwestern markets for the week this year, though 23 per cent. more than last year, were much less than in any previous year since 1877. They were also smaller than for two weeks previous.

The shipments of these markets were 2,582,000 bushels (1.58 per cent.) greater than in the corresponding week of last year, but less than in any other year since 1877. They were 817,000 bushels more than the previous week. The rail shipments were one-half greater than last year and a little greater than in 1880, but smaller than in three other years. The shipments down the Mississippi during the week were 157,900 bushels, or 3.8 per cent. of the whole.

The Atlantic receipts were nearly twice as great as in the corresponding week of last year, but less than in any other year since 1877. They were 1,299,,000 bushels (45 per cent.) more than the week before. This seems not to have been due to the beginning of arrivals by canal, however, so much as to the full opening of the St. Lawrence route and extraordinary receipts at New Orleans, which happened to fall within that week. At least the receipts at New York were but 216,000 bushels more than the week before, while there was a gain of 187,000 at Montreal, and of 760,000 at New Orleans. The latter have been exceeded but twice this year, and but few times in previous years; but they were not due to extraordinary river shipments, which in no week since April have been half as great as the receipts in this week ending May 19. The New York receipts, however, were the largest since March. In the next week the canal shipments should have greater effect.

The falling-off in Northwestern receipts since the first week of May has been at Chicago, Milwaukee and Toledo, while there has been a large increase at St. Louis. It should feel sooner than the more northern markets the shipments of farmers who have finished putting in their crops.

For the week ending May 19 the exports of Atlantic ports for three years have been:

	1881.	1882.	1883.
Flour, bbls	101,310	83,383	118,568
Grain, bu	3,114,802	935,200	2,051,842

The flour exports were larger than in 1881 even. Taking flour and grain together the exports were 1,174,000 bushels (83 per cent.) more than last year, and 1,156,000 bushels (32¼ per cent. (less than in 1881.

Southern Railway & Steamship Association.

The following circular from General Commissioner Virgil Powers is dated Atlanta, Ga., May 24:

"At a meeting of Western Lines, held at Southern Hotel, St. Louis, Mo., Monday, 21st inst., at which all Western Lines were represented by their general managers or other officers, it was unanimously resolved to re-affirm and put in effect that day (which was done) the rates of Circular Letter No. 35, Series 1882-83.

"Notice is therefore hereby given of withdrawal of Circular Letter No. 38, and restoration of rates of Circular Letter No. 35, Series 1882-83, between all points.

"I will issue in a few days revised copies of Circular Letter No. 35, correcting a few small typographical errors and changes caused by local tariffs.

"The Rate Committee meeting called for 30th instant is hereby postponed."

Iowa Trunk Lines Association.

A meeting was held in Chicago last week for the purpose of reorganizing the passenger department of the pool. No conclusion was reached and nothing was done, the Rock Island refusing to consent to any arrangement which would give the Milwaukee & St. Paul an equal share in the business. Another meeting was held this week, with the same result.

Kanawha Dispatch.

This is the name of a new fast freight line which is now being organized. It will run over the Chesapeake & Ohio and its connecting lines, and will start with a large number of cars put in by the roads interested. The headquarters will probably be in Cincinnati.

Peoria Passenger War.

A little passenger war has broken out at Peoria, Ill., between the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific companies. For several days matters have been carried to extremes, and tickets from Peoria to Kansas City were sold at 50 and even 25 cents, and the Rock Island sold tickets to Council Bluffs also for 50 cents. The Wabash has taken very little interest in the fight so far.

OLD AND NEW ROADS.

Arizona Mineral Belt.—Surveys are now being made for this road from Winslow, Ar., on the Atlantic & Pacific road, southward to Globe City, the centre of a new mining district. The intention is to continue the road from Globe City southward to the Southern Pacific at Benson.

Bedford & Bloomfield.—This road is being much improved in condition. It is said that a proposition has been made to extend the road eastward to Columbus, Ind., to connect with the Columbus, Hope & Greensburg road.

Bellaire, Zanesville & Cincinnati.—On the extension of this road westward from the old terminus at Woodsfield, O., the grading is now completed to Caldwell, 37 miles, and track has been laid to Louisville, 8 miles. On the western end track has been laid from Zanesville east 5 miles, and the grading is done for some miles further. On the 66 miles between Woodsfield and Zanesville there are two tunnels, one 600 and the other 800 feet long, and much other heavy work.

The old part of the road from Bellaire to Woodsfield, 42½ miles, has been nearly all relaid with steel rails, and the road-bed much improved.

Boston, Concord & Montreal.—At the annual meeting, May 28, the stockholders passed a resolution that it is expedient to unite this corporation with the Concord and the Northern companies on equitable terms, and that the subject be referred to the directors, with authority to make such arrangements as they may deem best.

A resolution instructing the board to oppose the passage of a general law by the New Hampshire Legislature was referred to the board with power to act.

Boston & Maine and the Eastern.—In Boston, May 29, the suit brought by a trustee under the Eastern mortgage to enjoin the lease of the road to the Boston & Maine, came up for a hearing. It was announced that no hearing would be had, the Eastern Co. having agreed that the lease should not be executed until the points raised could be heard by the Supreme Court.

Cambridge & Seaford.—This company has been organized by the bondholders who bought the Dorchester & Delaware road at foreclosure sale. The new company has $500,000 capital stock and no debt; a controlling interest is owned by the Philadelphia, Wilmington & Baltimore Co. The road extends from Seaford, Md., to Cambridge, 33 miles, and is a branch of the Delaware Railroad.

Central of New Jersey.—The New York Superior Court has granted a temporary injunction against the lease of this road to the Philadelphia & Reading Co., on application of Joseph W. Burnham, a holder of income bonds of the company. The injunction has been dissolved, as noted below.

The road was formally surrendered by the Receiver to the directors on May 26, the security required for the payment of the floating debt having been deposited. The Reading did not then take formal possession under the lease, partly, it is understood, on account of the Burnham injunction noted above, although that could not affect the possession of the road in New Jersey. Although formal possession did not pass, the road was then substantially under Reading management.

The first act of the new management was to send to the Pennsylvania Railroad Co. notice of the termination of the joint contract for the working of the New York & Long Branch road, and notice that the Pennsylvania trains will no longer be permitted to run over that road. This leads at once to litigation, as the Pennsylvania is not willing to be dispossessed in this summary way. The joint contract has still several years to run, and it is understood that the Pennsylvania will insist on its rights. Mr. Gowen claims that the contract was illegal, and cannot be enforced. If the courts should sustain this view, it is altogether likely that the Pennsylvania will build the competing line to Long Branch which it threatened to build a year ago. This line had been located and most of the right of way secured when the joint contract was made.

On May 29 a compromise was arranged in the Burnham suit, the suit being withdrawn and the temporary injunction vacated. The basis of the compromise is said to be an agreement to pay the income bondholders whatever interest an expert examination of the books may show to be due them under the terms of their bonds since May 1, 1878.

The road was formally transferred to the possession of the Philadelphia & Reading Co. under the lease on the same day. The lease was signed and the necessary orders issued by Presidents Gowen and Little. Orders were further issued extending the jurisdiction of the Philadelphia & Reading officers over the leased road.

On the same day also a bill in equity was filed by the Penn-

sylvania Railroad Co., in the United States Circuit Court in Trenton, N. J., to restrain the Central and the New York & Long Branch companies from interfering in any way with the running of the Pennsylvania trains over the Long Branch road or from violating the joint contract between the companies. The Court granted a temporary injunction and a rule to show cause why it should not be made permanent, returnable June 25.

The following is an abstract of the report made by Special Master Bedle to Chancellor Runyon upon the financial condition of Jersey Central:

Ex-Governor Bedle says that, pursuant to order of reference May 4, he was attended by Receiver Little and others at the Jersey Central office, May 5, 6, 7, 8 and 9, and was made acquainted with the financial condition of the company, upon which he reports:

1. The Jersey Central Company is solvent, and the facts stated in the application for terminating the receivership are true.

2. He advises granting the prayer of the petition, subject to sundry conditions.

3. He recommends that upon the delivery of the property to the company all liabilities should be charged upon the whole property, and remain a lien until discharged.

4. He considers that it will be just both to company and Receiver to dissolve the injunction and return the property to the company prior to the adjustment of the Receiver's accounts and discharge of receivership, provided the conditions embraced in the following statement are complied with.

A.—The temporary debt, consisting of demand and time loans, amounts to $2,062,000, an amount not larger than usual for companies doing a business of the magnitude of Jersey Central.

B.—In addition there are liabilities for current expenses averaging from $600,000 to $700,000, which have been regularly met and paid, the amount of which is now uncertain.

C.—There are contingent liabilities on account of accidents, contracts, etc., the amount of which cannot be determined.

D.—A claim appears to be made for interest on income bonds.

Offsetting these liabilities are unincumbered assets of the nominal value of $4,987,200. Governor Bedle says: "I estimate these assets, exclusive of $2,353,000 of Lehigh & Wilkesbarre second series income bonds, which have now no market value, at $1,500,000, although they are worth more."

He recommends that the Receiver should retain control of these unincumbered assests to protect himself until his accounts have been finally adjusted.

The company should also, for further protection, deliver to the Receiver available securities readily salable of the market value of $2,000,000, subject to sale or other disposition by the Receiver or Court. The character and value of such securities should be determined by the Receiver.

The temporary debt should be satisfied within three months from delivery of property to the company. Other liabilities should be discharged as they mature. The corporation should be ordered to discharge all debts and hold the Receiver harmless.

Following are among the items composing the floating debt:

Adams Express	$250,000
Nat. City bank	200,000
Am. Exchange Bank	200,000
State Bank of Elizabeth	100,000
Nat. Park Bank	150,000
Trenton Banking Co	100,000
Farmers' and Mechanics' Bank	50,000
C. Smith & Sons	400,000

Among the items making up the list of unencumbered assets are the following:

Manufacturer's R. R. stock	$79,000
Crystal Spring stock	56,100
Elizabeth & N. Y. Ferry stock	49,246
Alliance Coal Co. stock	102,078
Longwood Valley R. R. stock	100,000
Freehold & N. Y. R. R. stock	77,500
Lehigh & Luzerne coal bonds	150,000
Old Bankers' Slate Co. stock	25,000
Constable Hook R. R. stock	81,300
Lake Hopateong stock	17,730
High Bridge R. R. stock	50,000
Lehigh & Wilkesbarre 2d incomes	2,353,000
Tidewater Pipe Line bonds	23,420
Crystal Spring bonds	74,900

It will be seen that most of these are securities of leased and controlled lines, which have very little value, except to the Central itself. The assets also include advances to leased and controlled companies as follows: Dover & Rockaway, $33,709; Lehigh & Wilkesbarre, $90,557; Longwood Valley, $139,715; High Bridge Co., $186,254; Lehigh Coal & Navigation Co., loan account, $747,966.

The Master's report gives a condensed balance sheet as of date May 7, which is as follows:

Liabilities:

Funded debt	$35,514,000
Capital stock	18,563,200
Floating debt and current obligations	3,146,004
Bonds and mortgages on real estate	188,613
Corporate debts	93,814
Car trusts	3,104,000
Net earnings, 1882	597,276
Total	$61,207,508

Assets:

Railroad property	$17,615,153
Cash and accounts receivable	1,216,394
Real estate	1,540,749
Stocks held by company	11,757,502
Bonds held by company	8,620,993
Advances and loans due company	1,660,351
Equipment	14,763,008
Materials	850,001
Losses previous to 1882	3,183,353
Total	$61,207,508

The following statement has been published for the two months of the present year to Feb. 28:

Earnings	$1,514,856
Expenses (60.71 per cent.)	919,778
Net earnings	$595,078
Interest, etc., received	34,121
Total net income	$629,199
Interest, rentals, general expenses, etc	725,141
Deficit	95,942

The company estimates that the four months to the end of April will show an increase of $225,000 in net earnings.

Central Iowa.—An opposition ticket will be run at the annual meeting next week, by stockholders who are opposed to the present management. It is said that considerable support has been secured among the Boston stockholders.

Cincinnati, Washington & Baltimore.—The mortgages on this road (formerly the Marietta & Cincinnati) as executed and recorded under the plan of reorganization amount in all to $21,110,000, and are divided as follows: First—The bonds of the Scioto & Hocking Valley Railroad Co., in amount $300,000, drawing interest at the rate of 7 per cent. per annum. Second—The prior lien bonds of this company, in amount $500,000, drawing interest at 4½ per cent. per annum. Third—First mortgage bonds, in amount $1,250,000, drawing interest at 6 per cent.; $6,250,000, drawing 4½ per cent. interest. Fourth—Second mortgage bonds, in amount $3,040,000, interest at the rate of 5 per cent. per annum. Fifth—Third mortgage bonds, of the amount of $2,270,000, drawing interest at 3 per cent. per annum to Nov. 1, 1891, and 4 per cent. thereafter. Sixth—First income mortgage bonds, in amount $3,500,000, bearing no fixed rate of interest; and seventh—The second income mortgage bonds, to be issued to the amount of $4,000,000, and bearing no fixed rate of interest.

Columbia & Kootenay.—This company has been granted a charter by the Parliament of British Columbia to build a railroad from Kootenay Lake to the Columbia River near the mouth of the Kootenay River; also to run steamboats on the Columbia between the terminus of its railroad and the crossing of the Canadian Pacific near Eagle Pass.

Concord.—At the annual meeting in Concord, May 29, a protest was made against receiving the votes cast upon 6,189 shares alleged to be illegally held by the Northern Railroad Co. Resolutions were passed declaring that it is expedient to consolidate with the Boston, Concord & Montreal, the Northern and the Manchester & Lawrence companies, provided it can be done on reasonable and equitable terms, and referring the subject to the board of directors, with power to make an agreement of consolidation, to be submitted to the stockholders at a future meeting.

Concord & Claremont.—At the annual meeting, May 30, the stockholders voted unanimously in favor of consolidation with the Concord and other New Hampshire roads.

Dallas & Rockwall.—This company has been organized to build a railroad from Rockwall in Rockwall County, Tex., to Dallas, a distance of about 40 miles.

Detroit, Mackinac & Marquette.—This company has completed the location of an extension of its road from Marquette, Mich., to the iron mines, and work will very soon be begun upon it. The main line of the extension will be 14 miles long, and there will be about 3 miles of branches and spurs to mines. The line runs through a rough country and is expected to cost at least $40,000 a mile. It is announced that the company has made arrangements for the money needed for this work, and also for the branch from the main line near the St. Ignace end of the road to Sault Ste. Marie, for which several lines have been surveyed. This branch will be about 48 miles long, and the company's plans include a bridge over the St. Mary's River. Connection will be made there with a branch of the Canadian Pacific.

The money for these extensions, it is understood, is provided by Messrs. McMillan, Newberry and Palms, of Detroit, who have large interests in the Lake Superior region, and by George I. Seney and others, of New York, who are chiefly interested in the branch to the Sault Ste. Marie.

Easton & Bangor.—Surveys have been completed for this road from Easton, Pa., through the Bushkill Valley to the Wind Gap, and arrangements are now being made to begin work. The company has secured terminal grounds in Easton, and has also secured a large part of the right of way.

Gainesville, Jefferson & Southern.—President A. D. Candler, of this company, in an address to the stockholders, reports that the bonds of the company have been negotiated for an amount sufficient to pay off all the floating debt and to build the extension from Hoschton, Ga., to Jug Tavern. During the year ending April 30, there was $106,909 expended on the road. The floating debt has all been paid except notes amounting to $23,740, which have not yet matured, and which are provided for. The extension from Jug Tavern to Monroe has been located, and will be built if local aid is offered. The company has now $225,000 stock and $245,000 bonds outstanding.

Galveston, Harrisburg & San Antonio.—It is reported that this company will build a branch from San Antonio, Tex., northwest to the Texas & Pacific in Shackelford County. Some surveys for this line have already been made.

Great American & European Short Line.—The Canadian Parliament has voted a subsidy of $3,200 per mile to this company for so much of its projected road as will extend from the Straits of Canso through the island of Cape Breton to Sydney and Louisburg. The length of this section will be about 80 miles, calling for a total of $256,000 subsidy.

Gulf, Colorado & Santa Fe.—Negotiations are reported to be in progress between this company and parties in St. Louis and New York for the construction of a new line across Arkansas which will give this road an independent outlet for its business. It now labors under many disadvantages because of the quarrel between its managers and the Gould Southwestern system.

Indiana Air Line.—This company has filed articles of incorporation to build a railroad from Stillwell, in Laporte County, Ind., eastward to the Ohio line in Steuben County, a distance of 93 miles.

Indianapolis Union.—The directors of this company have under consideration a plan for the reorganization of its business, including freight transfers made by the Belt road. No particulars have been made public.

Jacksonville, St. Augustine & Halifax.—The track on this road is now all laid from the terminus on the St. Johns River opposite Jacksonville, Fla., southeast to St. Augustine, 39 miles. Some work remains to be done about the St. Augustine terminus, but regular trains will be put on in a few days. The extension of the road beyond St. Augustine is proposed, but nothing has been done toward it as yet.

Jersey Shore, Pine Creek & Buffalo.—The last rail on this road was laid on May 9. A special train with officers of the road and invited guests passed over its whole length on May 21. The road will be opened for traffic June 4, when the Fall Brook Coal Co., lessee, will begin to run regular trains over it. The total length of the main track from the junction with the Corning, Cowanesque & Antrim road at Stokesdale Junction to the junction with the Philadelphia & Reading, 3½ miles west of Williamsport, Pa., is 74.8 miles; of which 34.8 miles have been laid this year.

Kentucky Central.—This company offers to locate its principal repair shops at Paris, Ky., provided the people of that place will give 75 acres of land as a site for the shops and yard.

Lackawanna & Pittsburgh.—A considerable force is now at work on the grading of this road between Perkinsville, N. Y., and Canaseraga.

Louisville Short Route.—The trouble between this company and the Louisville & Nashville has been adjusted, and a line mutually agreed upon for the Short Route, which is a short piece of track intended to connect the Chesapeake, Ohio & Southwestern with other lines entering Louisville.

Manchester & Lawrence.—At the annual meeting in Manchester, last week, the stockholders passed resolutions approving the proposed consolidation with the Concord and other roads, and referring the subject to the directors, with power to make an agreement to be acted on at a future meeting of the stockholders.

Memphis, Selma & Brunswick.—Green, Hamilton & Co., contractors on this road, have attached all the property for unpaid claims for work done, and have begun suit to recover in addition $50,000 damages for breach of contract by the company.

Mexican Railroads.—The *Mexican Financier* give the following list, from official sources, of the railroads completed in Mexico up to the end of April:

	Miles.	Miles.
Tlascala Railroad		2.50
Orizaba-Ingenio		3.00
Nuetla-Tasciaco		3.75
San Andres		7.00
Tlalmanalco		9.00
Pueblo & Matamoros Izucar		19.00
San Martin		23.00
Tehuacan-Esperanza		31.00
Tehuantepec		31.00
Sinaloa & Durango		36.00
Vera Cruz-Medellin		39.00
Hidalgo R. R.		56.00
Pueblo-San Marcos		57.00
Yucatan lines		68.00
Mexico-Tlalpulalpam		75.00
Sonora Ry., Guaymas to Nogales		234.00
Interoceanic, Mexico to Cuantla and branches		183.00
Mexican National, Mexico to Acambaro	178	
Laredo southward	208	
Branches	87	
		473.00
Mexican Central, Mexico to Lagos	311.00	
Paso del Norte to Chihuahua	302.00	
Tampico to San Luis Potosi	62.50	
		675.50
Mexican Ry., Vera Cruz to Mexico	264 00	
Puebla and Jalapa branches	89.50	
		353.50
Total		2,379.25

The table foots up 2,379¼ miles, although the *Financier* gives the total completed road at 2,437 miles.

The Mexican National, the Interoceanic, the Hidalgo and the Yucatan lines are narrow gauge, the rest standard gauge. A number of the shorter lines given above are worked by horse power, and some of them have been in existence a long time.

Michigan & Ohio—Track on this road is now laid to Augusta, Mich., 32 miles eastward from the junction with the Grand Rapids & Indiana road at Allegan. The grading is now nearly completed on the whole line from Toledo to Augusta.

Missouri Central.—This company has been organized to build a railroad from Lexington, Mo., by Waverley and Malta Bend to Marshall in Saline County, a distance of 44 miles.

Natchez & Northwestern.—This company is asking local aid from the parishes on the line in Louisiana and the counties in Arkansas. The projected line is from the Mississippi River, opposite Natchez, to Pine Bluff, Ark. It is to be a narrow-gauge line.

Nebraska, Topeka, Iola & Memphis.—This Kansas road has been sold by its stockholders to the Kansas City, Lawrence & Southern Kansas Co., which is controlled by the Atchison, Topeka & Santa Fe. The road is completed from Girard, Kan., northwest to Walnut, 17 miles. It will be extended by the new owners about 20 miles, to Earleton, on the Lawrence road. It will be a valuable branch, giving the Atchison Co. a line directly into the best coal district in Kansas, and a supply of fuel much needed on its lines.

New York & New England.—The Railroad Commissioners of Connecticut have addressed a letter to this company, from which the following extracts are taken:

"At our semi-annual inspection of the various divisions of your road on the 8th, 9th and 10th inst., we were gratified to find your road, as a whole, in good condition, and to note many improvements made since our last inspection, and others now in progress, among which we will name the freight yard at East Hartford, which, when completed, will have no superior in this state; the greatly enlarged freight accommodations at Bristol and rearrangement of tracks at that place and at New Britain; the increase in sidings along the line, and the progress made in grading for the double track. * * * *

"At the time of our last report to your company we felt obliged to call attention to what we regarded as the not unreasonable complaint then so common of the failure of your passenger trains to arrive and depart on time, and of the great delay in the delivery of freight. We are therefore now the more happy to say that so far as we know these complaints have almost wholly ceased, and that as regards freedom from accidents, running of passenger trains on schedule time, and prompt delivery of freight, your record is such as will merit and receive the approbation of your patrons."

New York & North Pennsylvania.—This company has been organized to build a railroad from Gaines, Pa., to Coudersport, in Potter County, a distance of about 30 miles. The line will be an extension of the Addison & Northern Pennsylvania road, and both lines are under the same management. Work will be begun at once on the new line, a preliminary survey of it having been made and the final location partly agreed on.

New York, Lake Erie & Western.—A circular from S. Little, Auditor of this company, after giving the President's orders assuming control of the New York, Pennsylvania & Ohio road, says:

"Referring you to the foregoing orders, it is respectfully requested that you will continue to send your report of ticket sales over the New York, Pennsylvania & Ohio Railroad, to A. E. Clark, General Passenger Agent, Cleveland, Ohio, and your report for car mileage due it, to A. W. Davies, Car Accountant, Cleveland, Ohio, until further advised.

"All other reports and correspondence relating to accounts should be addressed to the undersigned (S. Little, Auditor, New York).

"Sales of coupon tickets at offices on that road, and mileage of foreign cars on it, will hereafter be included in the monthly reports of this company.

"Drafts in settlement of ticket balances will be made on,

and by, B. W. Spencer, Treasurer, New York, and should include both the New York, Lake Erie & Western, and New York, Pennsylvania & Ohio Railroad proportions.

"Remittances in settlement of mileage balances will be made to, and by, him, and should include both the New York, Lake Erie & Western and New York, Pennsylvania & Ohio Railroad proportions.

"Settlements for all business prior to May 1 should be made with the officers of the New York, Pennsylvania & Ohio Railroad Co."

New York Central & Hudson River.—The refusal of this company to run local trains on its belt tracks around the city of Buffalo, on account of the legal limitation of fares to two cents per mile, and the ordinances restricting speed of trains in the city, was noted some months ago. Buffalo people interested in the movement have since procured the passage of an act by the Legislature permitting the company to charge five cents per mile on this belt road, and of an ordinance by the City Council allowing a speed of 15 miles an hour, and the company has now agreed to put on the desired trains. The distance around the city by this line is a little over 14 miles, and stopping-places will be established at convenient points. Light trains will be run, consisting of an engine and one or two cars, and this belt service will begin in about two weeks. The frequency of the trains will be regulated by the amount of traffic developed, and the number of stations will also depend somewhat upon the requirements of the traffic as shown by experience. It is not probable that the full fare of five cents per mile will be charged for the whole trip, but that rate will be required between intermediate stations.

New York, Ontario & Western.—The extension from Middletown, N. Y., to Cornwall will be opened for traffic June 4, when the trains will begin running through to New York, using the New York, West Shore & Buffalo track from Cornwall.

New York, West Shore & Buffalo.—The track on the Albany Branch is now completed, the gap of 4 miles having been closed and the Normanskill bridge finished. This makes a continuous track from Weehawken to Albany. The road will be opened for traffic as far as Newburg on June 4, the company having given positive notice to that effect. As heretofore noted, trains will, for the present, run over the New York, Susquehanna & Western track from New Durham and use the Pennsylvania stations and ferries in Jersey City and New York. This arrangement will continue until the Weehawken station is ready for use.

Norfolk & Western.—This company makes the following statement for April and the four months ending April 30:

	April.	Four months.
Earnings	$190,996	$800,162
Expenses	109,769	462,068
Net earnings	$81,227	$338,094

For the four months there was an increase of $135,368, or 20.4 per cent., in earnings; an increase of $51,323, or 12.5 per cent., in expenses, and of $84,045, or 33.1 per cent., in net earnings.

The New River Division was not regularly opened for business until May 21. The earnings accruing from the operation of that division will, therefore, not appear until the month of June.

North Carolina & Tennessee.—Work is to begun soon on this projected road from Lenoir, N. C., northwest to the Tennessee line. Arrangements have been made for a consolidation with the Bristol & North Carolina Co., of Tennessee, which will extend the road to Bristol.

Northern Central.—This company makes the following statement for April and the year thus far:

	April.	Four months.
Earnings	$476,335	$1,969,318
Working expenses	259,866	1,103,657
Extraordinary expenses	21,675	178,427
Total expenses	$281,541	$1,282,084
Net earnings	$194,794	$687,234

For the four months the statement shows an increase of $313,120, or 19.4 per cent., in gross earnings; an increase of $52,393, or 5 0 per cent., in working expenses; an increase of $58,483, or 48.4 per cent., in extraordinary expenses, which include improvements and additions to property; an increase of $110,876, or 9.5 per cent., in total expenses, and an increase of $202,244, or 41.7 per cent., in net earnings.

Northern Pacific.—Regular trains on the western end of the road have begun to run to Jocko, Idaho, 15 miles eastward from the late terminus at Third Crossing. Work on this division is progressing very steadily.

On the eastern end the track is now laid for 40 miles westward from Gallatin, Mon., and 1,119 miles from St. Paul, leaving only about 15 miles to reach Helena. It is expected that a train can be run to Helena by June 10.

Old Colony.—The Boston *Advertiser* says; "The subject of extending the Old Colony Railroad, by building a section some 10 or 12 miles from Plymouth to Sandwich and connecting there with the Cape Cod Division of the same company, was agitated several years since without result. The question is again under consideration, and a conference with the directors of the Old Colony was had a day or two since. It is not likely that the extension will be built this year."

Oregon & California.—This company advertises for bids for the construction of the long tunnel through the Siskiyou Mountains near the California line. The terminus of the line and the point of junction with the extension of the Central Pacific's Oregon Division will be fixed at a conference to be held soon between the chief engineers of the two roads. The main Siskiyou tunnel will be 3,050 ft. long, and north of it are four other tunnels, varying from 250 to 1,700 ft. in length.

Oregon Railway & Navigation Co.—President Villard has agreed to build a railroad from Seattle, Wash. Ter., up the Cedar River to the Green River coal deposits, and to a connection with the Cascade Division of the Northern Pacific, provided the people of Seattle will raise $150,000 in aid of the line.

The Baker City Branch is now completed to Mikeeha, Or., 10 miles southeast of the late terminus at Pendleton, and 240 miles from Portland. Regular trains run to the new terminus.

Pennsylvania.—The stockholders of the Western Pennsylvania Railroad Co., whose road is leased to this company, met in Philadelphia, May 29, and approved an amended lease. They also voted to authorize an issue of $5,000,000 consolidated bonds, of which $3,000,000 are to be reserved to take up the bonds now outstanding.

The consolidation of the two companies which are building this company's line to Reading—the Philadelphia, Norristown & Phœnixville and the Phœnixville, Pottstown & Reading—into one corporation under the name of the Pennsylvania Schuylkill Valley Co., has been completed.

Philadelphia & Chester County.—The workmen who have been employed on the grading of this road, some 300 Italians, last week, caused almost a riot in Philadelphia by leaving their work and proceeding in a body to the company's office to demand their pay, which they had not received for two months. A small payment was finally made them. The railroad company, the construction company and a subcontractor are concerned, and it is not very clear with which of them the blame for the non-payment of the men rests; but it looks very much as if all three had been trying to build the road without money, and had not succeeded very well.

Portland & Ogdensburg.—The Portland (Me.) *Argus* reports that parties in New York have opened negotiations for the purchase of the controlling interest in the road, which is owned by the city of Portland.

Richmond, Irvine & Three Forks.—Surveys are being made for this road, and the line has been located from Richmond, Ky., to Beattyville, 42 miles. In this distance three tunnels will be required.

Richmond & Mecklenburg.—Work will soon be resumed on this road, the intention being to finish the extension from Chase City, Va., to Clarksville this summer.

Rochester & Pittsburgh.—Track is now all laid on the Buffalo Branch, the gap of 12 miles between Colden, N. Y., and the Cattaraugus bridge having been filled. There is still much work to be done before the road can be opened, as the track along the Buttermilk Creek, near Ashford, was badly washed this spring. On the Buffalo end the ballasting is well advanced. This branch leaves the main line at Ashford, N. Y., and runs northwest 44 miles to Buffalo.

A sharp fight over the crossing of the Delaware, Lackawanna & Western tracks in Buffalo is in progress.

St. Paul, Minneapolis & Manitoba.—Work has been begun on the extension of this company's line from Bartlett, Dak., northwest 20 miles to Devil's Lake. The grading is to be finished by July.

Saratoga, Mt. McGregor & Lake George.—Regular trains will begin to run over this road for the season on June 4. The road is only operated during the summer.

Savannah, Florida & Western.—This company has completed a handsome new building for its general offices in Savannnah, Ga. The building is 32 by 105 ft. and three stories high.

South Branch.—Negotiations are pending with the Baltimore & Ohio Co. for the completion of this road from Green Spring Run to Romney, W. Va., 16 miles. The road was graded several years ago, but no track laid.

Sparta & St. Louis.—This company has been organized to build a railroad from Sparta, Ill., northward to Tilden, on the St. Louis, Alton & Terre Haute road. The distance is about 7 miles.

Suncook Valley Extension.—It is said that work will very probably be begun this season on this road, which is to extend the Suncook Valley Branch of the Concord road from Pittsfield, N. H., to Alton Bay on Lake Winipisiogee, opening a new route for travel to the White Mountains.

Toledo, Cincinnati & St. Louis.—Regular trains will soon begin to run through to Ironton, O., over the branch of this road made up of the old Dayton & Southeastern and Iron roads.

Stock of the Narrow Gauge Elevator Co., a corporation organized to build grain elevators in Toledo and elsewhere along the line of the road, is offered to the subscribers of the Toledo & Delphos Trust in Boston. The corporation has already one large elevator, and desires to extend its operations.

Tucson & Point Lobos.—This company has bought the coal in a very large tract of land in the state of Sonora, Mexico, and will at once begin work in the development of its lands and on the construction of its railroad from a point on the Yaqui River to the Sonora Railroad.

Vicksburg, Shreveport & Pacific.—The change of this road from 5 feet 6 inch to standard gauge was begun May 14, but the work was stopped by high water and a washout when 26 miles out of the 73 had been changed. The work was to be resumed as soon as the water permitted.

The ties are now being delivered along the line of the extension from Monroe, La., to Shreveport, and tracklaying will soon be begun.

The earnings of the 73 miles of completed road from Delta to Monroe in April were $2,854, or only $39 per mile. Nevertheless they showed an increase of 371.7 per cent. over April, 1882, when the earnings of the road were $605, amounting to the munificent sum of $8 per mile—the smallest earnings we have ever seen reported.

Virginia & Carolina.—A deed has been executed and recorded pledging the property of this company as security for the payment of 7 per cent. interest on 2,000 shares of guaranteed stock. In addition, 2,000 shares of common stock have been issued to J. B. Winston in trust for J. P. Brinton, Charles Chauncey, Moncure Robinson, P. A. Wellford and C. E. Wellford, and 1,000 shares are retained by the company for the present. The road is to run from a point on the Raleigh & Gaston road to Petersburg and Richmond.

The contract for a section of 20 miles from the junction with the Raleigh & Gaston northward has been let to J. E. Adams & Co., work to be begun at once.

Washington, Ohio & Western.—The parties who bought the Washington & Western (formerly the Washington & Ohio) road at the recent foreclosure sale, have organized a new company under this name. They will at once proceed to extend the road from its present terminus at Round Hill, Va., westward 16 miles to Berryville, where it will connect with the Shenandoah Valley road.

Western North Carolina.—The Cowee tunnel on the Ducktown Branch is now opened through, the headings having met last week. It is 1,800 ft. long. Beyond the tunnel the grading is completed for 6 miles, within 3 miles of Charlestown in Swain County. The company will shortly build a large summer hotel at Round Knob, near Henry station, and will make other improvements there. Round Knob is one of the most conspicuous and picturesque peaks in the Blue Ridge.

West Jersey.—This company's statement for April and the four months ending April 30 is as follows:

	April.	Four months.
Earnings	$76,022	$276,746
Expenses	56,992	186,469
Net earnings	$19,030	$90,277

For the four months there was an increase of $29,917, or 12.1 per cent., in gross earnings: an increase of $41,376, or 28.5 per cent., in expenses, and a decrease of $11,459, or 11.2 per cent., in net earnings. The increase in expenses is due chiefly to large renewals and improvements in preparation for the summer business.

ANNUAL REPORTS.

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York & Peachbottom.

For the year ending April 30, this company operated a line of 3-ft. gauge from York, Pa., to Delta, 35 miles.

The earnings were as follows:

Freight	$31,950
Passengers	17,775
Mail, etc.	1,881
Total ($1,474 per mile)	$51,606
Expenses (72.3 per cent.)	37,305
Net earnings ($409 per mile)	$14,301

Since the close of the year an extension from Delta to Peachbottom on the Susquehanna River, 5 miles, has been completed.

Hanover Junction, Hanover & Gettysburg.

This company owns a line from Hanover Junction, Pa., to Gettysburg, 30 miles, and works under lease the Berlin Branch, 7 miles; the Bachman Valley road, 14 miles, and the Baltimore and Hanover, 20 miles, making 71 miles in all. The report is for the year ending March 31.

The equipment consists of 10 locomotives: 14 passenger and 2 baggage, mail and express cars; 39 box, 18 stock, 23 gondola, 34 lime and stone and 2 caboose cars; 1 derrick car.

The general account is as follows:

Stock		$116,850.00
Bonds		208,000.00
Floating debt and unclaimed dividends		10,732.00
Profit and loss		333,953.94
Total		$669,535.94
Road and property	$527,490.00	
Stocks of leased lines	111,450.00	
Materials	6,784.32	
Cash and cash assets	23,811.62	
		669,535.94

The stock is only $3,895 and the bonds $6,933 per mile owned, the property having been largely paid for out of earnings.

The traffic for the year was as follows:

	1882-83.	1881-82.	Increase.	P. c.
Locomotive miles	164,282	162,421	1,861	1.1
Passenger car miles	248,245	215,955	32,290	15.0
Freight car miles	280,692	248,780	31,912	12.8
Passengers carried	56,507	51,162	5,345	10 5
Passenger-miles	887,028	807,029	79,999	9.9
Tons freight carried	112,125	94,488	17,637	18.6
Ton-miles	946,265	812,798	133,467	16.4
Av. receipt:				
Per passenger-mile	2.63 cts.	2.63 cts.		
Per ton-mile	3.95 "	3.94 "	0.01 ct.	0.3

Of the freight-car mileage 195,826 miles were made by this company's cars, and 84,866 miles by foreign cars.

The earnings for the week were as follows:

	1882-83.	1881-82.	Inc. or Dec.	P.c.
Freight	$37,465	$33,906	I. $3,559	10.5
Passengers	23,445	21,280	I. 2,165	10-2
Mails, etc	7,692	9,928	D. 2,236	22.5
Working leased lines	25,338	24,973	I. 365	1.5
Total	$93,940	$90,087	I. $3,853	4.3
Expenses	60,154	58,228	I. 1,926	3.3
Net earnings	$33,786	$31,859	I. $1,927	6.2
Gross earnings per mile	1,323	1,269	I. 54	4.3
Net "	476	449	I. 27	6.2
Per cent of expenses	64.03	64.70	D. 0.67	

The earnings of the road owned, excluding the leased lines, were $3,131 gross and $1,126 net per mile.

The income account for the year is as follows:

Balance, April 1, 1882		$26,517.29
Net earnings, as above		33,785.85
Total		$60,303.14
Interest	$12,150.28	
Dividends, 4 per cent	4,960.00	
New construction and equipment	19,381.24	
		36,491.52
Balance, March 31, 1883		$23,811.62

During the year 129 tons of steel rails and 5,201 new ties were used in renewals. The work of ballasting with broken stone has been continued and the bridges and culverts repaired.

One ten-wheeled freight engine, 2 passenger cars, 10 freight cars and 1 caboose were added to the equipment.

Preliminary surveys have been made for a branch from the main line near New Oxford or from the Berlin Branch to York Springs, where connection will be made with the York Springs Branch of the Harrisburg & Potomac road. A considerable traffic is anticipated from a connection with that road.

An extension from Gettysburg through the Middletown Valley on the graded line of the old "Tape-Worm" road, which this company owns, is proposed. President Eichelberger's report says that it will be built, provided it can be shown that sufficient business can be secured to warrant the outlay.

Augusta & Knoxville.

This company owns a line from Augusta, Ga., to Greenwood, S. C., 70 miles. The report is for the year ending March 31, the first full year of the operation of the road.

The general account is as follows :

Stock	$127,630.00
First-mortgage bonds	630,000.00
Road earnings	102,900.80
Floating debt and accrued interest	40,119.18
Profit and loss	298.73
Total	$900,957.71
Road and equipment	$686,283.53
Real estate	8,839.38
Interest and discount	127,434.32
Road expenses	69,434.54
Cash and accounts	8,965.94
	900,957.71

The cost of road reported is $9,804 per mile, the bonded debt being $9,000 per mile. Expenditures on construction account last year were $108,436.63.

The earnings for the year were as follows :

Freight	$65,637.20
Passage	22,893.14
Mails, etc	2,539.14
Total ($1,301 per mile)	$91,069.48
Expenses (66.4 per cent.)	60,479.52
Net earnings ($437 per mile)	$30,589.96
Floating debt paid	$22,901.59
New construction	7,688.37
	$30,589.96

The report says: "The physical condition of the road has been much improved. All of the cuts, where the foundation was bad, have been widened and drained, and the larger part of the road-bed well ditched, and the trestles built of inferior timbers filled.

"As is generally known, the company was unable to meet the interest on its bonded debt falling due in January last. Temporary relief from this embarrassment is had by the purchase of the matured coupons by parties friendly to the road. It is important, however, that arrangements should be made at the earliest practicable time to pay off this liability, as well as to meet those accruing in July next. The management believes that after that time the net earnings of the road will be sufficient to meet promptly the interest charges of the company.

"More than two-thirds of the grading has been done on the Greenwood, Laurens & Spartanburg Railroad. Nothing, in the opinion of the management, is of such vital importance to the company as the early completion and operation of this line through to Spartanburg. The increase of business that would come to the Augusta & Knoxville road from this source would more than double its present earnings and put its future beyond contingency."

Concord.

This company owns a line from Nashua, N. H., to Concord, 35 miles; the Hooksett Branch, 7 miles; the Epping Branch, 1 mile, and the Manchester & North Weare road, 19 miles. It leases the Nashua, Acton & Boston, 20 miles, owning also nearly all the stock; the Suncook Valley road, 20.5 miles, and the Concord & Portsmouth road, 40.5 miles, making 62 miles owned and 143 worked. The report is for the year ending March 31.

For the greater part of the year the road was operated in connection with the Boston & Lowell road, under a joint agreement, which is now terminated.

The general account, condensed, is as follows :

Stock		$1,500,000.00
Det. and contingent		108,279.64
Interest, rentals and other accounts		102,961.13
Notes payable		170,000.00
Concord R. R., old stock account		48,000.00
Manchester & Lawrence accounts		42,175.58
Manchester & North Weare R. R		6,552.24
Sundry accounts		46,773.33
May dividend		75,000.00
Cashier Concord R. R.		40,081.95
Boston & Lowell, joint account		12,034.00
Total		$2,152,867.87
Construction	$1,500,000.00	
Other property accounts	274,160.01	
Materials	267,259.88	
Notes receivable	31,672.69	
Cash	79,775.29	
		$2,152,867.87

The company has no bonded debt of any kind.

The train mileage for the year was as follows:

	1882-83.	1881-82.	Inc. or Dec.	P. c.
Passenger	236,054	240,837	D. 4,783	1.9
Freight	352,991	326,038	I. 26,953	8.3
Service and switching	193,276	218,462	D. 25,186	11.4
Total	782,321	785,337	D. 3,016	0.4

The average train load last year was 112 passengers, or 102 tons of freight. The passenger train load reported is the largest we have ever seen.

The traffic for the year was as follows:

	Through.	Local.	Total.
Passengers carried	148,212	1,670,374	1,818,586
Passenger-miles	5,829,163	20,567,378	26,396,541
Tons freight carried	887,365	199,622	1,086,987
Ton-miles	29,729,343	6,243,376	35,972,719

No comparison can be made with the previous year, when the traffic was reported with that of the Boston & Lowell.

The earnings for the year were as follows :

	1882-83.	1881-82.	Inc. or Dec.	P.c
Freight	$730,166	$699,287	I. $30,879	4.4
Passenger	501,440	438,906	I. 62,534	14.2
Mail and express	34,384	29,829	I. 4,555	15.2
Rents, etc	51,890	90,398	D. 38,508	42.8
Total	$1,317,880	$1,258,420	I. $59,460	4.7
Expenses	887,562	787,211	I. 100,351	12.8
Net earnings	$430,318	$471,209	D. 40,891	8.7
Gross earn. per mile	9,216	8,902	I. 354	4.0
Net " "	3,009	3,318	D. 309	9.4
Per cent. of exps	67.27	62.56	I. 4.71	....

For eleven months of the year the road was worked under the contract with the Boston & Lowell. Included in expenses is the sum of $73,807.66 for new locomotives and cars bought on joint account.

The income account was as follows:

Net earnings, as above		$430,317.91
Tax on capital stock	$33,798.23	
Manchester & Lawrence Co.	58,683.58	
Manchester & Keene Co.	39,308.03	
Rentals	50,875.00	
Improvements at Concord, through cars, etc.	19,264.46	
Reserved for improvements and new cars	78,000.00	
		279,934.30
Surplus for the year		$150,383.61
Dividends, 10 per cent.		150,000.00
Balance		$383.61

The valuation of materials on hands increased $74,862.69 during the year.

The business connection with the Boston & Lowell Co. has been annulled, this company having received notice from the Boston & Lowell that a further continuance of the same would be unsatisfactory.

Additions have been made to the Manchester and Raymond stations. The new freight house and yard at Concord has been completed, and plans agreed on for a new passenger station and offices there.

During the year 363 tons of new steel rails were laid, 633 tons of iron rails repaired and relaid, and 91,181 new ties laid. There were 18,820 ft. new sidings built and 450 ft. of coal trestles erected. Four new bridges were built and 400 ft. of pile bridge filled in.

There were built in the shops one new locomotive, 1 baggage, 2 milk, 41 coal, 2 box, 50 flat and 35 dump cars. Two passenger cars were bought, and the company paid for its proportion of equipment for the Boston-Montreal line.

New York, Susquehanna & Western.

At the close of the last fiscal year, December 31, 1882, this company owned and worked the following lines :

	Miles.
West End, Jersey City, N. J., to Unionville, N. Y.	71.60
Two Bridges, Sussex County, N. J., to Gravel Place, Pa.	50.10
Columbia Junction, N. J., to Delaware	3.10
Paterson Extension Branch	0.75
Priceville to Winton—branch in Lackawanna Valley, Pa.	5.50
Total, owned	131.05
Unionville, N. Y., to Middletown (leased)	13.90
Lodi Branch (leased)	2.00
Total operated	146.95

Additions made during the year are noted below. From West End to Jersey City and New York the company uses the tracks, stations and ferries of the Pennsylvania Railroad.

The general account is as follows :

Common stock		$13,000,000.00
Preferred "		8,000,000.00
Bonded debt		6,850,000.00
Bills, accounts and balances		395,881 60
Profit and loss		19,410.32
Total		$28,265,291.92
Cost of property	$24,439,621.88	
Stocks and bonds owned	3,346,746.00	
Bills, accounts and balances	458,808.60	
Cash	20,115.44	
		28,265,291.92

The bonded debt consists of $3,500,000 Midland, of New Jersey, first-mortgage bonds; $250,000 Paterson Extension bonds; $2,500,000 general first-mortgage bonds and $600,000 debenture bonds. The yearly interest charge is $411,000.

The nominal amount of capital stock has been reduced from $30,000,000 to $21,000,000, divided into $8,000,000 preferred and $13,000,000 common stock.

The various classes of securities of the Midland, of New Jersey, which were convertible into the stock of this company now stand as follows :

	Converted.	Not converted.	Total.
Stock	$2,131,550	$868,450	$3,000,000
Income bonds, class A	1,896,322	1,103,678	3,000,000
" " class B	631,975	936,357	1,568,332
Scrip No. 1	856,032	435,615	1,291,647
Scrip No. 2	89,840	47,360	137,200
Total	$5,605,719	$3,391,460	$8,997,179

The old stock is convertible into new preferred, the other securities into new common stock.

The earnings for the year were as follows :

	1882.	1881.	Inc. or Dec.	P.c.
Freight and milk	$501,059	$459,463	I. $41,596	9.1
Passengers	187,442	152,443	I. 34,999	23.0
Mail, etc	37,457	28,945	I. 8,512	29.3
Total	$725,958	$640,851	I. $85,107	13.3
Expenses	478,002	424,426	I. 53,576	12.6
Net earnings	$247,956	$216,425	I. $31,531	14.6
Gross earnings per mile	7,260	7,495	D. 235	3.1
Net " "	2,480	2,531	D. 51	2.0
Per cent. of exps	65.84	66.23	D. 0.39	....

No statement of the disposition of net earnings is given. The net earnings were equivalent to 3.62 per cent. on the bonded debt, or about 60 per cent. of the yearly interest charge.

The General Manager reports that 22½ miles of steel rail and 99,887 ties were used on the old road; 2,400 ft. of the line were changed to a new location, and many other improvements made. The whole line, except about 10 miles, is now laid with steel rails.

The report says: "Our traffic contract with the Delaware, Lackawanna & Western Railroad Co. has worked with entire harmony and to the mutual satisfaction of both companies; under this contract coal only is shipped from Hoboken, N. J. Our trackage arrangement with the Pennsylvania Railroad Co., by which all our passenger and miscellaneous freight deliveries are made at Jersey City and New York, in its practical workings continues to prove highly advantageous to the interests of both companies. * * *

"The construction of the new line of railway of this company, extending from Two Bridges, Sussex County, N. J., to Gravel Place, Pa., its point of intersection with the Delaware, Lackawanna & Western Railroad—three miles west of Stroudsburg—and its branches in the Lackawanna Valley, Pennsylvania, connecting the coal operations of the company with the main line of the Delaware, Lackawanna & Western Railroad, was completed on Oct. 9 last, since which date the road has been regularly operated.

"The Paterson Extension Branch was completed on May 1, 1882, and the increase in freight and passenger traffic from that city over the receipts of previous years has exceeded our expectations, being over 68 per cent., both passenger and freight.

"The merger of the Blairstown Railroad on Jan. 18 last was effected so as to conform to the statutes, this company being the owners of the entire capital stock of that company.

"In September last this company secured control of the Lodi Branch Railroad, and has lately consummated a traffic arrangement with the New Jersey & New York Railroad Co., by which an interchange of business is secured, which it is expected will add materially to its business.

"A mutually advantageous traffic agreement has also been consummated between our company and the New York, Ontario & Western and the New York, West Shore & Buffalo companies, by which our road will form a connecting link from Little Ferry Junction to West End, a distance of 8 miles—its point of connection with the Pennsylvania Railroad. From the extent of territory tributary to to these extensive railway systems, a large increase of revenue may be looked for from this source during the coming year.

"This company commenced its transportation of coal on Oct. 25, 1882, and for the year ending Dec. 31, 1882, transported a daily average of 700 tons. During January the daily average was 900 tons; during February 1,000 tons; during March 1,150 tons, and during April over 1,200 tons. By June 1 the daily output will be increased to 2,000 tons.

"This company controls a majority of the stock of the Pennsylvania Anthracite Coal Co., which company owns in fee and under lease about 3,000 acres of choice coal lands, located near Scranton, Pa. It is now producing about 25,000 tons of coal monthly, and so soon as developments are completed, which will be accomplished during the current year, the coal product from this property will be not less than 500,000 tons per annum.

"It has in addition under its control, by virtue of its traffic contracts, the entire production of its collieries operated by John Jermyn, and the Lackawanna Coal Co., Limited, from which it is now receiving a daily supply of 700 tons, and increasing from month to month.

"The coal traffic for the current year will add to the gross revenue of the company not less than $500,000; and from passenger, freight and miscellaneous sources on the extended line from Two Bridges to Gravel Place at least $120,000 in addition thereto."

The gross earnings for four months to April 30 this year have been $291,778, an increase of $102,629, or 54 per cent., over those of the corresponding period in 1882.

Boston, Concord & Montreal.

This company owns a line from Concord, N. H., north by west to Woodsville (Wells River), and thence northeast to Groveton, 145 miles, with a branch from Wing Road to Mt. Washington, 22 miles, making 167 miles in all. The company has also leased the Pemigewasset Valley road, from Plymouth to North Woodstock, 20 miles, but that road was not yet opened for travel at the close of the fiscal year, March 31.

The equipment consists of 32 engines; 26 passenger, 2 drawing-room, 3 observation, 21 mail and baggage cars; 834 freight cars. To this are added by the lease of the Pemigewasset Valley road 2 engines, 2 passenger and 125 freight cars.

The general account is as follows :

Stock (old, dividends, etc.)		$459,600.00
" new		540,400.00
" preferred		800,000.00
Total		$1,800,000.00
Funded debt		3,056,600.00
Coupons and dividends unclaimed		22,964.89
Profit and loss		624,337.44
Total		$5,503,902.33
Road and extensions	$4,373,000.00	
Improvement account	503,608.38	
Sinking fund	201,500.00	
Pemigewasset House	16,000.00	
Materials	223,830.90	
General Manager's account	27,909.39	
Cash and bonds on hand	158,053.66	
		5,503,902.33

The bonded debt consists of $200 old bonds due in 1865 and never presented for payment; $624,000 due in 1889; $1,932,400 due in 1893, and $500,000 due in 1911. It was increased by $1,000 bonds of 1893.

Construction account was not changed, but the improvement account was increased by $52,926.48 during the year, that amount being expended for new ballasting and steel rails.

Of the bonds of 1889 only $202,000 are really outstanding, the company holding $116,000 and the trustees $306,000.

The traffic for the year was as follows :

Train miles:	1882-83.	1881-82.	Inc. or Dec.	P. c.
Passenger	422,510	422,587	D. 77	....
Freight	644,227	586,595	I. 57,632	9.8
Service	47,460	38,817	I. 8,643	21 9
Total	1,114,197	1,047,999	I. 66,198	6.3
Passengers carried	335,001	312,785	I. 22,216	7.1
Passenger miles	11,319,775	10,190,083	I. 1,129,692	11.1
Tons freight carried	383,077	345,744	I. 37,333	10.8
Ton-miles	22,984,650	20,744,648	I. 2,240,002	10.8
Av. train load :				
Passenger, No.	27	24	I. 3	12.5
Freight, tons	36	35	I. 1	2.9

Of the passsengers carried 39.3 per cent., and of the tons carried 89.2 per cent. were to and from other roads.

The earnings for the year were as follows:

	1882-83.	1881-82.	Inc. or Dec.	P. c.
Freight	$503,399	$532,619	D. $29,220	5.5
Passengers	348,744	331,309	I. 17,435	5.2
Mail, etc	68,052	38,979	I. 29,073	74.5
Total	$920,195	$902,907	I. $17,288	1.9
Expenses	697,651	669,158	I. 28,493	4.5
Net earnings	$222,544	$233,749	D. $11,205	4.8
Gross earn. per mile	5,510	5,407	I. 103	1.9
Net " " "	1,333	1,400	D. 67	4.8
Per cent. of exps	75.81	74.11	I. 1.70	....

Extensive repairs and improvements were made to the equipment and road-bed. There were 80,444 new ties used and 9,709 old rails repaired and relaid. There were 5½ miles of new sidings built.

The income account is as follows:

Bonds and cash on hand, April 1, 1882		$199,061.79
Net earnings for the year		222,544.10
Interest and premium		20,494.03
Bonds sold		1,000.00
Decrease in General Manager's account		21,388.94
Total		$464,488.86
Interest	$207,463.47	
Dividends on preferred stock, 5 per cent.	39,285.00	
Improvement account	52,926.48	
Increase in materials on hand	6,760.25	
		$306,435.20
Bonds and cash on hand, March 31, 1883		$158,053.66

A report says: "The surveys for a line to extend from Northumberland toward Colebrook on the Vermont side of the Connecticut River, have been completed and a reasonably favorable line has been formed. In order to construct the road on this route, it will require authority to be given by the state of New Hampshire to extend a branch from the present line to and across the Connecticut River, to connect with a corporation to be organized to construct the portion in Vermont, and with like authority to recross again into New Hampshire, to connect with the line at or near North Stratford. Application will be made for authority to so cross and recross the Connecticut River at the next session of the Legislature.

"The Pemigewasset Valley Railroad has been substantially completed from Plymouth to North Woodstock, and the lease of the same to this road has been executed, and the directors are of the opinion that it will prove to be a valuable feeder for the main line. The depots on the Pemigewasset Valley Railroad have not yet been completed, and some other minor matters remain to be finished from time to time as required by this corporation, payment of the proper cost of such completion and addition to be made by the former road.

"Though negotiations for the renewal of the contracts with the lower roads have been continued during the past year, no result has as yet been reached."